



NACE Standard RP0295-2003
Item No. 21070

Standard Recommended Practice

Application of a Coating System to Interior Surfaces of New and Used Rail Tank Cars

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Foreword

This standard recommended practice has been prepared for the rail car industry to address the need for high-quality application of coatings to the interior surfaces of rail tank cars handling a variety of chemicals at various temperatures. Qualified inspection of the completed coating system and testing by the use of adequate, readily available instruments are also covered.

This standard emphasizes that corrosion and product contamination are major factors that must be considered in the design of tank cars transporting liquid commodities. In addition to adhering to the conditions set forth in this standard, these tank cars must comply with U.S. Department of Transportation⁽¹⁾ Code of Federal Regulations (CFR) Title 49, Part 179;¹ Transport Canada (Transportation of Dangerous Goods [TSG])⁽²⁾ CAN/CGSB⁽³⁾-43.147,² and Association of American Railroads⁽⁴⁾ Standard M1002.³ This standard is not meant to provide a full treatise on corrosion of steel by chemicals, which is an extensive subject in its own right. For further information the reader is referred to data published by NACE International and other sources.

Although most coatings are applied to prevent shipped product from being contaminated by a corroding tank car, DOT and AAR are attempting to resolve the issue of how much corrosion should be allowed in tank cars. One factor to consider when adding a corrosion allowance is the required life of the tank car. The extra wall thickness of a tank car that is expected to be in service for 40 to 50 years can add substantially to the tank car's weight and result in a severe reduction in carrying capacity. In cars handling corrosive liquids, adding a corrosion allowance without any other form of corrosion protection is clearly not a practical solution for long-term operation.

This standard was first developed by NACE International Task Group T-14C-6, a component of Unit Committee T-14C on Rail Equipment Corrosion. It was reaffirmed in 2003 by Specific Technology Group (STG) 43 on Land Transportation. This standard is issued by NACE under the auspices of STG 43.

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*, 4th ed., Paragraph 7.4.1.9. *Shall* and *must* are used to state mandatory requirements. The term *should* is used to state something good and is recommended but is not mandatory. The term *may* is used to state something considered optional.

⁽¹⁾ U.S. Department of Transportation (DOT), 400 7th St. SW, Washington, DC 20590.

⁽²⁾ Transport Canada (TDG), 330 Sparks Street, Ottawa, ON K1A 0N5 Canada.

⁽³⁾ Canadian General Standards Board (CGSB), Ottawa, ON K1A 1G6 Canada.

⁽⁴⁾ Association of American Railroads (AAR), 50 F St. NW, Washington, DC 20001-1564.

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Section 1: General

1.1 This standard describes a procedure for the application of a coating system to the interior surfaces of new and used rail tank cars that transport various commodities.

1.2 The requirements for surface preparation, coatings, application, inspection, and quality tests for coating a tank car internally also are covered in this standard.

1.3. Liquid coatings discussed in this standard may be hazardous; therefore, basic safety precautions regarding the handling and application of these coating materials and solvents shall be used. *Coatings and Linings for Immersion*

Service contains more detailed information in its chapter on safety.⁴ The material safety data sheets (MSDSs) supplied by the coating manufacturer provide additional information relative to government regulations.

1.4 Appendix A is an example of a suggested tank car coating system inspection report form.

1.5 Appendix B describes essential facilities and equipment for application of a coating system to the interior of tank cars.

Section 2: Definitions and Acronyms

AAR: Association of American Railroads.

Car Owner: The person or firm that owns the tank car. (This person or firm may also be the contracting authority.)

Coat: One layer of a coating applied to a surface in a single continuous application to form a uniform film when dry.

Coating Applicator: The firm that is executing the specified work.

Coating System: The complete number and types of coats applied to a substrate in a predetermined order. (When used in a broader sense, surface preparation, pretreatments, dry film thickness, and manner of application are included.)

Contracting Authority: The person or firm responsible for the approval and purchase of a completed tank car coating system.

Crater: A surface anomaly. The formation of small, bowl-shaped depressions. A cavity with diameter equal to or greater than the depth at the opening.

DFT: Dry-film thickness.

DFT Measurement: An average of three DFT readings.⁵

DFT Reading: A single DFT gauge determination.

DOT: U.S. Department of Transportation.

Discontinuity: A void, crack, thin spot, foreign inclusion, or contamination in the coating film that significantly lowers the dielectric strength of the coating. It may also be identified as a holiday or pinhole.

Holiday: A discontinuity in a protective coating that exposes unprotected surface to the environment. See *discontinuity*.

Holiday Detector: An instrument that locates discontinuities in a coating film applied to a conductive surface.

MSDS: Material safety data sheet.

Pinhole: Film defect characterized by a small, pore-like flaw in the coating that, when extended entirely through the coating, appears as a discontinuity. A pinhole in the finish coat may not appear as a discontinuity.

Pit: A surface anomaly. A cavity, usually round in shape, with depth equal to or greater than the diameter at the opening.

Pot Life: The elapsed time within which a coating can be effectively applied after all components of the coating system have been thoroughly mixed.

Profile: Anchor pattern on a surface produced by abrasive blasting or acid treatment.

Quality Assurance: All those planned and systematic actions necessary to provide specified documentation and adequate confidence that the tank car coating system will perform satisfactorily in service.

Quality Control: Those quality assurance actions related to the physical characteristics of the entire coating system's application as a means of providing compliance with specified requirements.

Shelf Life: As defined by the coating manufacturer, maximum length of time before application that a coating can be stored in an unopened manufacturer-sealed container at a temperature range specified by the coating manufacturer.