

ANSI/AWS C2.18-93R
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**Guide for the
Protection of
Steel with Thermal
Sprayed Coatings
of Aluminum and
Zinc and their
Alloys and
Composites**



American Welding Society



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Guide for the Protection of Steel with Thermal Sprayed Coatings of Aluminum and Zinc and Their Alloys and Composites

Prepared by
AWS Committee on Thermal Spraying

Under the Direction of
AWS Technical Activities Committee

Approved by
AWS Board of Directors

Abstract

This guide presents an industrial process for the application of thermal spray coatings (TSC) on steel. It covers safety, job/contract description, background and requirements, selection of TSCs, TSC operator qualification, materials and equipment, application-process method with quality-control check points, Job Control Record, maintenance and repair of TSCs, records, debris containment and control, and warranty.



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Guide for the Protection of Steel with Thermal Sprayed Coatings of Aluminum and Zinc and Their Alloys and Composites

1. General

1.1 Scope. This guide covers the application of thermal spray coatings (TSC) for the protection of steel with aluminum, zinc and their alloys, mixtures, and composites. This scope of this guide includes the major elements of an industrial process instruction covering job description, safety, consumable materials, surface-preparation and thermal spray equipment, quality control (QC) equipment, TSC operator training and qualification, a step-by-step surface preparation and thermal spraying application method with quality control checkpoints, maintenance and repair of thermal spray coatings, and a job control record. Nominal TSC feedstock spray rates and coverage information for a common planning base are presented for purchasers and contractors. A TSC selection guide for various service environments and the operator qualification requirements are presented in appendices. This guide is modelled on the thermal spray method of MIL-STD-2138A(SH), *Metal Sprayed Coating Systems for Corrosion Protection Aboard Naval Ships*.¹

1.2 Definitions. The following define abrasive blast cleaning methods for various surface finishes.

Abrasive Blast Cleaning:

NACE No. 1: White-Metal Blast-Cleaned Surface Finish. Defined as a grey-white (uniform metallic) color, slightly roughened to form a suitable pattern for coatings. This surface is free of all oil, grease, dirt, mill scale,

rust, corrosion products, oxides, paint, and other foreign matter. (NACE No. 1 is comparable to SSPC-SP 5, *White Metal Blast Cleaning*.)²

SSPC-SP 5: White-Metal Blast Cleaning. These blast-cleaned surfaces must have a uniform, grey-white metallic color and must be free of all oil, grease, dirt, mill scale, rust, corrosion products, oxides, old paint, stains, streaks, or any other foreign matter.³

NACE No. 2: Near-White Blast Finish. This is defined as a surface from which all oil, grease, dirt, rust scale, and foreign matter have been completely removed except for slight shadows, streaks, or discolorations (of oxides bonded with metal). At least 95% of any given surface area has the appearance of NACE No. 1, and the remainder of the area is limited to slight discolorations. (NACE No. 2 is comparable to SSPC-SP 10 *Near-White-Metal Blast Cleaning*.)

SSPC-SP 10: Near-White-Metal Blast Cleaning. A near-white metal blast-cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining as noted. Staining shall be limited to no more than 5% of each square inch of surface area and may consist of light

1. Military specifications are available from Standardization Order Desk, 700 Robbins Avenue, Building #4, Section D, Philadelphia, PA 19111-5094.

2. *Visual Standard for Surfaces of New Steel Centrifugally Blast Cleaned with Steel Grit and Shot*, TM0175-75. Available from National Association of Corrosion Engineers, 1440 South Creek Drive, P.O. Box 218340, Houston, TX 77084.

3. *Steel Structures Painting Manual*, Volume 2. Available from Steel Structures Painting Council (SSPC), 4400 Fifth Avenue, Pittsburgh, PA 15213-2683.