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Installation of Thin Metallic Wallpaper Lining in Air Pollution Control and Other Process Equipment

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ABSTRACT

This standard provides guidelines that assist in specification writing for handling and installing nickel-based alloy, stainless steel, and titanium linings in air pollution control equipment (e.g., flue gas desulfurization [FGD] systems, ducts, and stacks). It Includes information on materials, design, delivery, storage, and handling, as well as substrate preparation and installation, and detailed information on welding, welder performance qualifications, inspection, and repair.

This standard is intended for use by those specifying and installing thin metallic linings (nickel alloy, stainless steel, and titanium) in air pollution control and other process equipment subject to corrosive conditions.

KEYWORDS

Welding, flue gas desulfurization (FGD), metallic wallpaper lining, nickel alloy, stainless steel, titanium, air pollution, TG 129.

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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.

Extremely corrosive conditions are encountered by certain types of air pollution control equipment. Such equipment is subject to wide temperature fluctuations and formation of condensates containing sulfuric, sulfurous, and other acids. Flue gas desulfurization (FGD) slurry environments may contain significant aggressive contaminants of halides and oxidizing ions (e.g., Fe). High-performance metals and alloys are being used to resist these environments. The application of these materials to a carbon steel or other substrate as thin metallic linings is commonly called wallpapering. Wallpapering has been identified as a practical and effective method of providing anticorrosive linings in both new equipment and retrofit installations. Wallpapering is widely applied in response to power industry (utility) FGD experiences, and is equally applicable to use in other air pollution control and process equipment subject to corrosive conditions.

This standard practice provides technical and quality assurance guidelines for handling and installing nickel alloy, stainless steel, and titanium linings in air pollution control equipment (e.g., FGD systems, ducts, and stacks). The concepts and guidance included in this standard may also be useful in other process industries, but may require modification to meet the requirements of a particular process. This standard is intended to be a basis for preparation of a specification to be agreed on by contracting parties for the installation of wallpaper lining in air pollution control and other process equipment. It is the responsibility of users of this standard to determine the suitability of specific procedures, metals, and alloys for particular applications.

This standard practice is intended for use by those specifying and installing thin metallic linings (nickel alloy, stainless steel, and titanium) in air pollution control and other process equipment subject to corrosive conditions.

This standard was originally prepared in 1992 by Task Group (TG) T-5F-5 of NACE Unit Committee T-5F, "Corrosion Problems Associated with Pollution Control," and was revised by that TG in 1998. TG 129, "Welding: Flue Gas Desulfurization (FGD) Techniques," revised this standard in 2003, 2012, and 2018. TG 129 is administered by Specific Technology Group (STG) 45, "Pollution Control, Waste Incineration, and Process Waste." This standard is issued by NACE International under the auspices of STG 45.

Installation of Thin Metallic Wallpaper Lining in Air Pollution Control and Other Process Equipment

Section 1: General

1.1 This standard provides technical and quality assurance guidelines for handling and installing nickel alloy, stainless steel, and titanium linings in air pollution control equipment such as FGD systems, ducts, and stacks.

1.2 The guidelines in this standard are also applicable to installation of thin, high-performance metallic linings in a wide variety of other process equipment. However, titanium welding procedures contained herein are only applicable to seal welds in air pollution control equipment.

1.3 It is the responsibility of users of this standard to determine the suitability of construction materials specified for particular applications.

1.4 This standard is applicable to wallpapering materials of 1.6 to 3.2 mm (0.063 to 0.13 in) thickness applied as linings over new or existing metallic structures. General safety requirements to perform this work are beyond the scope of this standard. It is assumed that users will incorporate specific safety requirements in accordance with their individual needs.

1.5 New and improved welding techniques as well as new alloys applicable to wallpaper installation are being developed. References to specific weld designs and techniques in this standard are not intended to preclude the use of newer technology. Use of alternative techniques shall be mutually agreed on by all contractual parties after adequate engineering analysis.

1.6 The corresponding ASME[1] material specifications may be used instead of the ASTM[2] material specifications cited in this standard.

1.7 While the techniques described in this standard have demonstrated high levels of success, some extreme environmental and/or design conditions encountered in the use of air pollution control equipment can result in corrosive conditions so severe that even the most corrosion-resistant construction material will occasionally fail. Such failures generally affect a relatively small percentage of the total lined surface and may require periodic maintenance.

Section 2: Installation of Nickel Alloy Linings

2.1 Materials

2.1.1 Nickel alloy lining materials with a nominal content of at least 9% molybdenum (Mo) shall be selected in accordance with the requirements of the particular application and ASTM specifications. Superaustenitic stainless steels are addressed in Section 3.

2.1.2 The nickel alloy lining materials and copies of the certified mill test reports shall be supplied in accordance with purchase orders.

2.2 Storage and Handling

2.2.1 All nickel alloy lining materials shall be stored and handled in a manner that does not result in damage to or contamination of the nickel alloys.

2.2.2 All nickel alloy lining materials (including cut or formed pieces) shall be marked to maintain material identity and separation. These identifying marks shall not be made in such a way as to contribute to corrosion of the nickel alloy.

[1] ASME, Two Park Avenue, New York, NY 10016-5990.
[2] ASTM International (ASTM), 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.