NACE Standard RP0199-2004
Item No. 21087

Standard
Recommended Practice

Installation of Stainless Chromium-Nickel Steel and Nickel-Alloy Roll-Bonded and Explosion-Bonded Clad Plate in Air Pollution Control Equipment

Revised 2004-02-12
Approved 1999-01-16
NACE International
1440 South Creek Dr.
Houston, Texas 77084-4906
+1 (281)228-6200

ISBN 1-57590-075-0

Foreword

The purpose of this standard recommended practice is to provide technical and quality assurance guidelines for the fabrication, welding, and installation of stainless chromium-nickel steel and nickel-alloy roll-bonded and explosion-bonded clad plate in air pollution control and other process equipment. It is intended for use by personnel including architect engineers, designers, fabricators, and personnel from electric utilities and firms in the process industries.

This standard was originally prepared in 1999 by NACE Task Group T-5F-6, a component of Unit Committee T-5F on Corrosion Problems Associated with Pollution Control. It was revised in 2004 by Task Group 199 on the Installation of Stainless Chromium-Nickel Steel and Nickel-Alloy Roll-Bonded and Explosion-Bonded Clad Plate in Air Pollution Control Equipment. This Task Group is administered by Specific Technology Group (STG) 45 on Pollution Control. This standard is issued by NACE International under the auspices of STG 45.

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 considered good and is recommended but is not mandatory. The term *may* is used to state something considered optional.

NACE International
Standard
Recommended Practice

Installation of Stainless Chromium-Nickel Steel and Nickel-Alloy Roll-Bonded and Explosion-Bonded Clad Plate in Air Pollution Control Equipment

Contents

Section 1: General

1.1 This standard provides technical and quality assurance guidelines for the fabrication, welding, and installation of stainless chromium-nickel steel and nickel-alloy roll-bonded and explosion-bonded clad plate conforming to ASTM(1) A 264[1] or A 265[2] in air pollution control equipment. Included are flue gas desulfurization (FGD) absorbers, ducts, stacks, and other process equipment. It is intended to be the basis for preparation of a specification to be agreed on by contracting parties.

1.2 For the purposes of this standard, the term *alloy* is used to describe either the stainless chromium-nickel steel or nickel-alloy portion of the clad-steel plate as well as the equivalent solid stainless chromium-nickel steel or nickel-alloy material.

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

1.4 This standard is only applicable to materials that conform to the following standards or to comparable material specifications as agreed on by contracting parties. In all cases, the latest revision of the standard shall be used: ASTM A 264, ASTM A 265, AWS(2) A 5.1,[3] AWS A 5.4,[4] AWS A 5.9,[5] AWS A 5.11,[6] AWS A 5.14,[7] AWS A 5.17,[8] AWS A 5.18,[9] AWS A 5.20,[10] AWS A 5.22.[11]

1.5 General, commercial, and safety conditions are beyond the scope of this standard. It is assumed that users will establish these specifications in accordance with their individual requirements.

1.6 The following codes and specifications may be useful in the development of a specification for the installation of clad plate for air pollution control and other process equipment that supplements this standard.

- ASME(3) Boiler and Pressure Vessel Code: Section II,[12] Parts A, B, C, and D; and Section IX[13]
- ASNT(4) SNT-TC-1A[14]
- ASTM specifications for various metals and alloys
- AWS specifications for testing procedures (AWS B 1.10,[15] AWS B 2.1[16])
- Applicable ISO,(5) European, and regional standards and regulatory documents

1.7 This standard recommends fabrication procedures incorporating complete joint-penetration welds. Alternative construction techniques, such as partial-penetration welds covered by batten strips in accordance with NACE Standard RP0292,[17] are not addressed in this standard.

1.8 New and improved welding techniques as well as new alloys are being developed. References to specific weld designs and techniques in this standard are not intended to preclude the use of newer technology. The use of alternative methods should be mutually agreed on by all contracting parties.

1.9 For the purposes of this standard, ASME material specifications may be used in place of ASTM material specifications.

Section 2: Welding—General

2.1 The appendices in this standard are as follows:

2.1.1 Procedures for handling clad materials are presented in Appendix A.

2.1.2 Procedures for attaching structural members to clad plate are presented in Appendix B.

2.1.3 Procedures for cleaning fabricated clad plate are presented in Appendix C.

2.2 Weld joint preparation of clad plate shall be made by machining, plasma-arc cutting, or grinding. All thermal cuts should be ground back as necessary to remove dross. Care should be taken to ensure that any grinding does not contaminate the weld area and that machined surfaces are clean and free of filings, burrs, and oil.

2.3 Figures 1 through 4 illustrate recommended weld joint designs for various clad plate thicknesses welded with accessibility to one or both sides. Table 1 identifies the alloys that should be welded with the weld joint designs illustrated in the figures. Table 2 provides recommended filler metals, and Table 3 provides recommended dimensions for the figures. The recommended joint designs are not mandatory but alloy filler metals, such as the types

(1) ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19248-2959.
(2) American Welding Society (AWS), 550 NW LeJeune Road, Miami, FL 33135.
(3) American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5900.
(4) American Society for Nondestructive Testing (ASNT), 4153 Arlingate Plaza, Columbus, OH 43228-1518.
(5) International Organization for Standardization (ISO), 1 rue de varembe, Case Postale 56, CH-1121 Geneve 20, Switzerland.