

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

© 2024 Association for Materials Protection and Performance (AMPP). All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise) without the prior written permission of AMPP.

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

This AMPP standard represents a consensus of those individual members who have reviewed this document, its scope, and provisions. Its acceptance does not in any respect preclude anyone, whether he or she has adopted the standard or not, from manufacturing, marketing purchasing, or using products, processes, or procedures not in conformance with this standard. Nothing contained in this AMPP standard is to be construed as granting any right, by implication or otherwise, to manufacture, sell, or use in connection with any method, apparatus, or product covered by Letters Patent, or as indemnifying or protecting anyone against liability for infringement of Letters Patent. This standard represents minimum requirements and should in no way be interpreted as a restriction on the use of better procedures or materials. Neither is this standard intended to apply in all cases relating to the subject. Unpredictable circumstances may negate the usefulness of this standard in specific instances. AMPP assumes no responsibility for the interpretation or use of this standard by other parties and accepts responsibility for only those official AMPP interpretations issued by AMPP in accordance with its governing procedures and policies which preclude the issuance of interpretations by individual volunteers.

Users of this AMPP standard are responsible for reviewing appropriate health, safety, environmental, and regulatory documents and for determining their applicability in relation to this standard prior to its use. This AMPP standard may not necessarily address all potential health and safety problems or environmental hazards associated with the use of materials, equipment, and/or operations detailed or referred to within this standard. Users of this AMPP standard are also responsible for establishing appropriate health, safety, and environmental protection practices, in consultation with appropriate regulatory authorities, if necessary, to achieve compliance with any existing applicable regulatory requirements prior to the use of this standard.

CAUTIONARY NOTICE: AMPP standards are subject to periodic review and may be revised or withdrawn at any time in accordance with AMPP technical committee procedures. AMPP requires that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of initial publication and subsequently from the date of each reaffirmation or revision. The user is cautioned to obtain the latest edition. Purchasers of AMPP standards may receive current information on all standards and other AMPP/NACE/SSPC publications by contacting AMPP Customer Support, 15835 Park Ten Place, Houston, Texas 77084-5145 (Tel: +1-281-228-6200, email: customersupport@ampp.org).

Document History:

2024-02-27: Reaffirmed by AMPP Standards Committee (SC) 06, Process Industries

2018-06-17: Revised by NACE International Task Group (TG) 199

2009-06-26: Revised by NACE TG 199

2004-02-12: Revised by NACE TG 199

1999-01-16: Approved by NACE TG T-5F-6

AMPP values your input. To provide feedback on this standard, please contact: standards@ampp.org

NACE SP0199-2024

©2024 Association for Materials Protection and Performance (AMPP). All rights reserved.

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

Foreword	4
Section 1 General	4
Section 2 Welding—General	5
2.1 Appendixes	5
2.2 Weld Joint Preparation	5
2.3 Weld Joint Designs	5
Section 3 Welding Procedure Qualification	11
Section 4 Welder Performance Qualification	11
Section 5 Weld Quality	11
Section 6 Inspection	12
Section 7 Repair of Defective Welds	13
References	13
Appendix A Procedures for Handling Clad Plates and Fabricated Components Made from Clad Plates (Mandatory)	15
Appendix B Procedures for Attaching Structural Members to Clad Plate (Nonmandatory)	15
Appendix C Procedures for Cleaning Fabricated Clad Plate (Nonmandatory)	16
FIGURES	
Figure 1 Weld Accessible from Both Sides: Alloy-Side Root Pass	6
Figure 2 Weld Accessible from Both Sides: Steel-Side Root Pass	6
Figure 3 Weld Accessible from Alloy Side Only	7
Figure 4 Weld Accessible from Both Sides: Plates 13 mm (0.50 in) and Greater	8
TABLES	
Table 1 Suggested Dimension A1 in Figures 1 through 3	9
Table 2 Designations for Alloy Cladding Materials	9
Table 3 Alloy Weld Filler Metals	10
Table 4 Maximum Allowable Weld Reinforcement and Undercut of Groove Welds	12

Foreword

The purpose of this standard 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 equipment. It is intended for use by personnel including architect-engineers, designers, fabricators, and personnel from electric utilities.

In AMPP standards, the terms *shall* and *must* are used to state requirements and are considered mandatory. The term *should* is used to state something that is recommended, but is not considered mandatory. The term *may* is used to state something considered optional.

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⁾ A264¹ or A265² in air pollution control equipment (e.g., flue gas desulfurization [FGD] absorbers, ducts, and stacks). 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 clad-steel plate or 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 A264, ASTM A265, AWS⁽²⁾ A5.1,³ AWS A5.4,⁴ AWS A5.9,⁵ AWS A5.11,⁶ AWS A5.14,⁷ AWS A5.17,⁸ AWS A5.18,⁹ AWS A5.20,¹⁰ AWS A5.22,¹¹ AWS A5.34¹²
- 1.5** Standard terms and conditions and safety considerations are beyond the scope of this standard. It is assumed that users will establish and incorporate these aspects within the specification in accordance with their individual requirements.
- 1.6** The following codes and specifications supplement this standard. They may be useful in the development of the specification for this work.
- ASME⁽³⁾ Boiler and Pressure Vessel Code: Section II,¹³ Parts A, B, C, and D; and Section IX¹⁴
 - ASNT⁽⁴⁾ SNT-TC-1A¹⁵
 - ASTM specifications for various metals and alloys
 - AWS specifications for welding procedures (AWS B1.10,¹⁶ AWS B2.1¹⁷)
 - Applicable ISO,⁽⁵⁾ European, and regional standards and regulatory documents
- 1.7** This standard uses fabrication practices that incorporate full-penetration welds. Alternative fabrication practices, such as use of partial-penetration welds covered by batten strips in accordance with NACE SP0292,¹⁸ 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 instead of ASTM material specifications.

⁽¹⁾ ASTM International (ASTM), 100 Barr Harbor Dr., West Conshohocken, PA 19248-2959, www.astm.org.

⁽²⁾ American Welding Society (AWS), 8669 NW 36th St., Ste. 130, Miami, FL 33166-6672, www.aws.org.

⁽³⁾ ASME, Two Park Avenue, New York, NY 10016-5990, www.asme.org.

⁽⁴⁾ American Society for Nondestructive Testing (ASNT), 1711 Arlingate Lane, Columbus, OH 43228-0518, www.asnt.org.

⁽⁵⁾ International Organization for Standardization (ISO), Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, www.iso.org.