

Agenda Item: 650-2064

Title: Sub size impact testing for duplex stainless steels

Date: May 16, 2022

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Purpose: Acceptance testing for duplex stainless materials and weld qualifications

Source: Doug Miller

Revision: 0

Impact: Neutral.

Rationale: Charpy impact testing is required for both product qualification and weld qualification (per ASTM A923 and A1084) as well as minimum design temperature testing for -20 to -40°F MDT. The testing for product thickness (and weldments) where the thickness is less than 0.375" requires a sub-size specimen. While ASTM A370 Table 9 and ASME UG 84.2 address the correlation of sub-size results with standard size test both caution that specific test data should be the basis for any comparison. There have been no studies to develop correlations for any duplex grades or product forms thereof to allow use of sub-size impact specimens for standard qualification tests. ASTM A1084 addresses this in paragraph 8.5 discussing the conversion factors need for specific alloy and product form data. However, in paragraph 1. 1.3 it allows that an agreement between purchaser and supplier for a specific acceptance criterion may be a possible solution. For material qualification per A923 and A1084 qualification can rely on the corrosion test alone. For minimum design temperature testing a waiver or a purchaser/supplier agreement will be required.

Similar language should be added to API 620.

Proposal: X.2.3.1

| | |
|-------------------|---|
| UNS S32205/S31803 | Methods B ³ & C |
| UNS S32003 | Methods B ^{1,3} & C ² |
| UNS S32750 | Methods B ^{1,3} & C |
| UNS S32550/S32520 | Methods B ^{1,3} & C |
| UNS S32760 | Methods B ^{1,3} & C ² |

³B where sub-sized specimens are required Method B testing may be either waived

in favor of Method C testing only or a specific acceptance criterion is agreed upon between Purchaser and Manufacturer.

X.2.3.2

| | |
|------------|----------------------------|
| UNS S32304 | Methods B ¹ & C |
| UNS S32202 | Methods B ¹ & C |
| UNS S32101 | Methods B ¹ & C |
| UNS S82011 | Methods B ¹ & C |

¹B where sub-sized specimens are required Method B testing may be either waived in favor of Method C testing only or a specific acceptance criterion is agreed upon between Purchaser and Manufacturer.

X.2.3.3.1

C) for components where sub-sized impact specimens are used a specific acceptance criterion, agreed upon between Purchaser and Manufacturer, is required.

FOR REVIEW ONLY