Alberta Municipal Affairs

ABSA the pressure equipment safety authority

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DIRECTIVE

Interpretation of non-destructive examination requirements of welds using the Submerged Arc Welding (SAW) process for 2¼Cr-1Mo-V vessels

1.0 Introduction

Information received indicates that cracking that is being discovered in 2¼Cr-1Mo-V SAW welds typically occurs after the first 600 °C (approx 1100 °F) heat treatment cycle. Such cracking is only seen with the SAW process and has been determined by laboratory analysis to be reheat cracking. We understand that crack sizes are approx 2 to 4mm x 10mm (small), are transverse in weld metal only, occur in clusters along the length of the weld, and at different depths (except within 10mm of the surface).

To properly assess if the welds are acceptable, the examination technique was reported to be manual shear wave UT in the longitudinal and circumferential scanning directions with a 70 degree angle probe, calibrated to a 3mm side drilled hole, and using a frequency of 2-4 MHz.

The issue has been reviewed by different technical committees of ASME and API and efforts are being made to fast track revisions to different standards to clarify non-destructive examination requirements specifically for the SAW welds of 2¼Cr-1Mo-V vessels.

To promote uniformity of application of the above Code requirements in Alberta, this Directive describes the interpretation of the Code rules that shall be enforced for pressure vessels constructed with 2¼ Cr-1Mo -V for use in the Province of Alberta.

2.0 Background

For SAW welds in 2¼ Cr-1Mo-V vessels, careful selection of examination techniques, scans, calibrations and acceptance criteria are necessary to provide the sensitivity required to detect cracking which may exist in association with the fabrication process. The examination process shall be verified prior to the acceptance of the design for registration.

K. T. Lau, Ph.D., P. Eng.
Chief Inspector and Administrator
Pressure equipment Safety
Province of Alberta