Avoiding Environmental Cracking in Amine Units

API RECOMMENDED PRACTICE 945
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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

Contents

Figures

Avoiding Environmental Cracking in Amine Units

1 Scope

This recommended practice (RP) discusses environmentally assisted cracking of carbon steel equipment in amine treating units. Amine stress corrosion cracking and sulfide stress cracking of stainless steels in amine units is beyond the scope of this document, although there have been isolated reports of such problems. This RP provides guidelines for carbon steel construction materials including their fabrication, inspection, and repair to help assure safe and reliable operation. The carbon steels referred to in this document are defined by the ASTM designation system, or are equivalent materials contained in other recognized codes or standards. Welded construction is considered the primary method of fabricating and joining amine unit equipment. See terms 3.6 and 3.7 for the definitions of weld and weldment.

This document is based on current engineering practices and insights from industry experience. Older amine units may not conform exactly to the information contained in this RP, but this does not imply that such units are operating in an unsafe or unreliable manner. No two amine units are alike, and the specific strategies to avoid cracking in a unit will be customized to that unit. Each user company is responsible for safe and reliable unit operation.

Rotating equipment is specifically excluded from the API 945 scope. However, API 610 on centrifugal pumps does have a table that recommends PWHT of all welds in amine services.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda) applies.

API 510, *Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration*

API 570, *Piping Inspection Code: Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems*

API Recommended Practice 572, *Inspection of Pressure Vessels*

API Recommended Practice 579-1/ASME FFS-1,*Fitness-for-Service*

API Recommended Practice 582, *Welding Guidelines for the Chemical, Oil, and Gas Industries*

API Standard 653, *Tank Inspection, Repair, Alteration, and Reconstruction*

API Recommended Practice 583, *Corrosion Under Insulation and Fireproofing*

API Technical Report 938-C, *Use of Duplex Stainless Steels in the Oil Refining Industry*

API Recommended Practice 956, *Hydrogen-Assisted Crack Growth in 2-$^{1}/_{4}$ Cr-1 Mo Steel*

American Welding Society (AWS), AWS D.10.10

NACE SP0472 [1] , *Methods and Controls to Prevent In-Service Environmental Cracking of Carbon Steel Welments in Corrosive Petroleum Refining Environments*

NACE No. 2/Near-White Metal Blast Cleaning SSPC-SP 10

[1] Association for Materials Protection and Performance (AMPP), formerly NACE International.