

# Avoiding Environmental Cracking in Amine Units

API RECOMMENDED PRACTICE 945  
FOURTH EDITION, SEPTEMBER 2022



American  
Petroleum  
Institute

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## Contents

	Page
<b>1</b> Scope.....	1
<b>2</b> Normative References .....	1
<b>3</b> Terms and Definitions .....	2
<b>4</b> Background on Amine Units .....	2
<b>4.1</b> Amine Units Process Description .....	2
<b>4.2</b> Amine Solution Types .....	3
<b>4.3</b> Problems in Amine Units.....	4
<b>5</b> Guidelines for Construction Materials and Fabrication of New Equipment and Piping.....	6
<b>5.1</b> Construction Materials .....	6
<b>5.2</b> Fabrication .....	7
<b>6</b> Inspection and Repair of Existing Equipment .....	11
<b>6.1</b> General .....	11
<b>6.2</b> Inspection .....	11
<b>6.3</b> Examination Procedures and Methods.....	12
<b>6.4</b> Repair of Damaged Equipment .....	14
<b>6.5</b> Postweld Heat Treatment of Undamaged or Repaired Equipment.....	15
ANNEX A (informative) Cracking Mechanisms.....	16
ANNEX B (normative) Considerations for Corrosion Control.....	27
ANNEX C (normative) Historical Guidelines for PWHT for Various Amine Types .....	32
ANNEX D (informative) Request for New Information Concerning Problems with Environmental Cracking in Amine Units.....	34
Bibliography.....	37

## Figures

<b>1</b> Simplified Process Flow Diagram of a Representative Amine Unit .....	3
<b>A.1</b> Sulfide Stress Cracking in an Existing Hardened Heat-Affected Zone of a Weld.....	17
<b>A.2</b> Hydrogen Blisters Near the ID Surface of a Carbon Steel Flange.....	18
<b>A.3</b> Stress-Oriented Hydrogen-Induced Cracking (HIC) in a Carbon Steel Specimen .....	18
<b>A.4</b> Stress-Oriented Hydrogen-Induced Cracking .....	20
<b>A.5</b> Alkaline Stress Corrosion Cracking in the Vicinity of a Weld .....	22
<b>A.6</b> Alkaline Stress Corrosion Cracking in a Pipe Weld in MEA Service.....	23
<b>A.7</b> Alkaline Stress Corrosion Cracking in an Elbow in DEA Service.....	24
<b>A.8</b> Intergranular Alkaline Stress Corrosion Cracking in DEA Service .....	25
<b>D.1a</b> Report Form for New Information Concerning Problems with Environmental Cracking in Amine Units .....	35
<b>D.1b</b> Report Form for New Information Concerning Problems with Environmental Cracking in Amine Units .....	36

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# 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 amendments) 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 587, *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<sup>1</sup>, *Methods and Controls to Prevent In-Service Environmental Cracking of Carbon Steel Weldments in Corrosive Petroleum Refining Environments*

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

<sup>1</sup> Association for Materials Protection and Performance (AMPP), formerly NACE International.