



INSPECTION, INTEGRITY AND CORROSION TRAINING

Damage Mechanisms in Refining and Process Equipment

5 day course

Classroom, online or in-house

Course overview

A crack at a weld toe in a sour water stripper and one found in an austenitic line after a hydrotest can look alike on a radiograph and share nothing in cause. API 571 catalogues the mechanisms that refinery and petrochemical hardware suffers, and this programme trains delegates to name the one in front of them. Going mechanism by mechanism, they cover sulphidation, naphthenic acid attack, high temperature hydrogen attack and the Nelson curves, creep, temper embrittlement, sigma phase, chloride and caustic cracking, polythionic acid cracking, ammonium chloride and bisulphide attack, and thermal fatigue. For each they learn the susceptible alloys, the process trigger, the appearance and the technique that reveals it. Delegates leave able to build a damage mechanism review for a unit and to read a failure report critically.

What you will learn

- Explain how API 571 organises damage mechanisms by type and by unit
- Identify the susceptible alloys and process triggers for each major mechanism
- Recognise sulphidation, naphthenic acid attack and high temperature hydrogen attack from their appearance
- Interpret the Nelson curves for hydrogen service
- Distinguish chloride, caustic and polythionic acid cracking in austenitic and carbon steels
- Evaluate creep, temper embrittlement, sigma phase and thermal fatigue in hot equipment
- Select the detection technique suited to each mechanism
- Prepare a damage mechanism review for a process unit

Who should attend

- Inspection engineers in refineries and petrochemical complexes
- Materials and corrosion engineers
- Process engineers who set operating conditions for hot hydrocarbon units
- Reliability engineers leading failure investigations
- Inspection team leaders preparing turnaround scopes

Course outline

- 01 How API 571 classifies damage
- 02 Sulphidation and naphthenic acid attack
- 03 High temperature hydrogen attack and the Nelson curves
- 04 Creep, temper embrittlement and sigma phase
- 05 Chloride, caustic and polythionic acid cracking
- 06 Ammonium chloride and ammonium bisulphide attack
- 07 Thermal and mechanical fatigue
- 08 Matching detection techniques to mechanisms
- 09 Building a damage mechanism review for a unit

Upcoming dates



Dates	Venue	Format	Fee per delegate
19 to 23 October 2026	Kigali, Rwanda	Classroom	USD 1,325
9 to 13 November 2026	Nairobi, Kenya	Classroom	USD 1,325
16 to 20 November 2026	Online	Online	R8,500
8 to 12 March 2027	Dar es Salaam, Tanzania	Classroom	USD 1,325

Fees and how to register

This 5 day course is **R8,500** per delegate online, **R19,950** in the classroom in South Africa, Botswana, Namibia, Lesotho and Eswatini, and **USD 1,325** in the classroom elsewhere in Africa. In-house training is quotation on request. Book 2 or more delegates on this course and save 10%.

To register or request an in-house proposal, visit www.afrisciencegroup.com, email info@afriScience.co.za, or WhatsApp us on **+27 63 479 1136**.

AfriScience Group | +27 61 536 6531 | info@afriScience.co.za | Pretoria, Gauteng, South Africa