

This course can be adapted to virtual classroom mode

Non-Destructive Testing for Petrochemical Industries

5 days
Overview

NDTIW-EN-A

LEVEL

Knowledge

PURPOSE

This course explains basic and advanced non-destructive testing methods used in the Oil & Gas industry as well as the chemical industry.

LEARNING OBJECTIVES

Upon completion of the course, the participants will be able to:

identify available non-destructive examination methods,
select effective non-destructive examination methods based on the type of degradation, equipment and material,
evaluate external on stream NDT and internal NDT during plant shutdown,
understand maintenance work linked to NDT applications.

WAYS AND MEANS

Case studies to identify capabilities and limitations of each NDT.
Practical demonstration of non-destructive examination in a workshop.

LEARNING ASSESSMENT

Final quiz.

PREREQUISITES

Provide evidence of a professional experience of at least 1 month, related to the concerned field.

MORE INFO

Basic knowledge of pressure vessel technology, heat exchangers, furnace, boilers and piping and basic knowledge of different forms of degradations will be useful.

Agenda

BASIC & ADVANCED NDT TECHNIQUES

2 d

Visual test, Liquid Penetrant test (PT), Magnetic Test (MT), Radiographic Test (RT), Ultrasonic Testing (UT, TOFD, Phased Array, IRIS), Leak Testing (LT), Electromagnetic testing (ET), Positive Material Identification (PMI), Infrared Thermography (IR), Hardness, Acoustic Emission, Magnetic Flux Leakage.

For each technique, study:

The basic physical principles.

The type of degradation to be detected.

The limitations and exclusions.

The pros and cons compared to other NDT.

Safety and health features.

NDT certification according to ISO and ASNT. Dates of expiration and re-issue.

Visual:

Identify local or generalized corrosion, read color and aspect of rust/corrosion compound to obtain preliminary clues about the degradation type.

Select appropriate light intensity.

Penetrant test and magnetic test:

Surface preparation methods, different types of penetrants and developers.

Observation of the cracks.

Thickness UT, shear wave, TOFD :

Surface preparation, types of probes.

Analysis of the various signals.

Radiography - X rays and gamma rays:

Understand the relationship between energy and time exposure.

Review safety issues during field or shop choosing.

Read radiographic films to analyze remaining thickness and cracks.

Discover new developments such as digital radiography.

IR thermography: after appropriate tuning, manipulate the camera to see hot spots.

Hardness:

Practice Brinell , Rockwell or Vickers methods; compare results for carbon steel and stainless steel.

Practice test on base metal, heat affected zone, and weld and infer the tensile strength.

PMI: practice the method on different metallurgies.