

Non-Destructive Testing Courses by TCR Arabia (1/6)

Magnetic Particle Testing – Level I and Level II

Scope

This course covers the principles of Magnetic Particle Testing and prepares a candidate to

- Setup and calibrate equipment
- Interpret and Evaluate Results with respect to Applicable Codes, Standards and Specifications
- Familiar with the scope and limitations of the Methods
- Write test reports.

Training

Training Material is presented in Module that are followed by Quizzes

General Training

Personnel Certification: ASNT SNT-TC-1A

MODULE 1: MANUFACTURING DISCONTINUITIES

- Types of Discontinuities: Inherent, Processing and Service
- Casting Discontinuities: Hot Tear, Cold Shut, Porosity, Shrinkage
- Primary Processing Discontinuities including discontinuities in Rolling, Forging, Drawing, Extruding

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- Secondary Processing Discontinuities including discontinuities in Grinding, Heat Treating, Machining, Welding, Plating
- Service Discontinuities: Erosion, Wear, Fatigue, Corrosion, Creep, Hydrogen Attack

MODULE 2: THEORY OF MAGNETISM

- Magnetic field, Lines of force, Flux density
- Definitions of Permeability, Reluctance, Retentivity, Residual Magnetism and Coercive Force
- Diamagnetic, Paramagnetic and Ferromagnetic materials
- Leakage flux
- Fleming's Right Hand and Left Hand Rule
- Types of Magnetic Fields: Circular, Longitudinal, Vector
- Hysteresis Curve

MODULE 3: METHODS OF MAGNETIZATION

- Magnetization By Means of Electric Current
- Types of current AC, HWDC

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- Circular field: Head Shot (Direct Contact), Prods and Central Conductor Techniques, Offset Central Conductor
- Advantages and disadvantages of circular field
- Longitudinal field: Coils and Yoke
- Advantages and disadvantages of Longitudinal Field
- AC and DC Field Distribution in a Magnetic and a Nonmagnetic Conductor
- Demagnetization

MODULE 4: EQUIPMENT

- Equipment consideration
- Wet Horizontal, Mobile and Portable Equipments
- Fluorescent testing, Black Light
- Accessories

MODLULE 5: MEDIUMS AND THEIR PREPARATION

- Dry and Wet method
- Particles: Dry and Wet

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Magnetic Particle Testing – Level I and Level II

- Properties of particles
- Visibility of particles
- Methods of Application
- Contamination of Magnetic Particles
- Settling Test Procedure
- Concentration for Wet suspensions as per ASME Sec V Article 7
- Bath Maintenance

MODULE 6: APPLICATIONS

- Residual and Continuous Method
- Magnetic Particle Inspection of Solid Cylindrical Parts, Gears, Multiple diameter Articles, Discs, Hollow Cylindrical Articles
- Selection of proper method of magnetization
- Verification of magnetic fields
- Checking the adequacy of field using the Pie gauge, shims
- Magnetic Rubber Inspection

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MODULE 7: TYPES OF INDICATIONS

- Interpretation including Relevant, False, Non-relevant indications

MODULE 8: Codes and Standards (SPECIFIC TRAINING)

- MT Inspection Procedures

Codes

- ASME Section V Article 7 2004
- ASME Section VIII (Accept/Reject Criteria)
- ASME B 31.1 – Power Piping
- ASME B 31.3 – Petrochemical Piping

Standards

- ASTM E-709
- ASTM E-1444

Other codes and standards can be discussed if prearranged with the instructor at the time of registration

PRACTICAL TRAINING

- MT Yoke: Dry Visible, Wet Visible, Wet Fluorescent
- Central Conductor

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- Coil Shot - Longitudinal
- Ketos (Betz) Ring – Depth of penetration
- Training on Weld defect samples

EXAMINATIONS

- General
- Specific
- Practical

Candidates must score a minimum of 70 % in each individual test and a minimum average of 80% in all three tests.

The duration of this course is for 3 days and it is conducted by NDT experts from TCR Arabia. Students will be given an ASNT Level II certificate at the end of this course.

All courses, unless specified in advanced with the client, will be conducted at the training facility located at: **TCR Arabia Limited | Gas Gardens, King Abdulaziz Seaport, Dammam, Saudi Arabia**