

# P2210

# LIQUID PENETRANT INSPECTION

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## COURSE OUTLINE

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### Day One

#### LESSON 1 – Overview of the Method

- Course Objectives
- Capabilities and Limitations of the Method
- Objectives of Testing
- Materials and Classification of Liquid Penetrant Techniques
- Section Quiz

#### LESSON 2 – The Liquid Penetrant Process

- Overview of the Process
- Test Piece Preparation and Pre-cleaning
- Section Quiz
- Penetrant Application and Dwell Times
- Techniques of Penetrant Removal
- Section Quiz
- Developers and their Application
- Inspection of Indications: Interpretation/Evaluation
- Post-Cleaning
- Section Quiz

### Day Two

#### LESSON 3 – Equipment and Materials

- Physical Properties of Penetrant Materials and the Factors Affecting their Operation
- General Considerations: Calibration and Contamination
- Stationary Equipment - a Modular Approach to Liquid Penetrant Processing
- Auxilliary Equipment
- Portable Equipment - Don't Tie Me Down
- Section Quiz

#### LESSON 4 – PT Material Properties and Parameters

- Penetrant Material Performance Characteristics
- Penetrant Sensitivity
- Detection, Perception and the Human Eye
- The Physical Properties of the "Ideal" Penetrant
  - Flash Point and Volatility
  - Capillary Action: Wetting Capability, Surface Tension, Cohesion and Adhesion, Viscosity, Specific Gravity, Removability
  - Sensitivity, Dyes, Brightness
  - Dimensional Threshold of Fluorescence
  - Ultraviolet and Thermal Stability
- Physical Properties of Emulsifiers
- Developers and Sensitivity
- Special Purpose Materials and their Application
- Section Quiz

#### LESSON 5 – Discontinuities and Classifying Indications

- Origin and Nature of Discontinuities
  - Inherent Discontinuities
  - Processing Discontinuities
  - In-service Discontinuities
- The Inspection Process: Interpretation and Evaluation

- Penetrant Indications
  - False Indications
  - Nonrelevant Indications
  - Relevant Indications
- Examples of Indications
- Section Quiz

#### ASSESSMENT EXAMINATIONS:

- **General Exam** – covers the basic principles (Body of Knowledge) of Liquid Penetrant Testing.
- **Specific Exam** – tests ability to read, interpret and apply specific procedure material for the method.
- **Practical Exam** – hands-on demonstration of the ability to operate test equipment, perform specific calibrations and tests in order to find and report flaws of sample materials according to appropriate specifications.

