



Accredited Africa Training Institute for Capacity Development

Unit FO409, Hatfield Plaza · 1122 Burnett St, Hatfield 0028 · Pretoria, Gauteng · South Africa

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COURSE BROCHURE

Inspect Complex Non Metallic Manufactured Components And Assemblies Training

Manufacturing, Engineering and Technology / Manufacturing and Assembly

Unit Standard 120225 · NQF Level 4 · 28 Credits · 25 Days

COURSE OVERVIEW

This course equips learners with the knowledge and skills to inspect complex non-metallic manufactured components and assemblies, ensuring compliance with quality standards and specifications. It focuses on identifying defects, using appropriate inspection tools, and documenting findings to maintain product integrity. The training is essential for quality assurance in manufacturing environments where non-metallic materials like polymers, composites, and ceramics are used.

Category	Manufacturing, Engineering and Technology
Subfield	Manufacturing and Assembly
Unit Standard	120225
Accreditation	SAQA Accredited · NQF Level 4 · 28 Credits
Duration	25 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Apply inspection techniques to evaluate complex non-metallic components and assemblies against specified standards.
- Analyze defects and deviations using appropriate measuring instruments and visual inspection methods.
- Evaluate inspection results to determine component conformity and identify corrective actions.
- Implement inspection procedures and document findings in accordance with quality management systems.
- Demonstrate understanding of material properties and their impact on inspection criteria.
- Use relevant safety protocols and handling procedures during inspection activities.

WHO SHOULD ATTEND

- This course is designed for quality control inspectors, manufacturing technicians, and production supervisors involved in the inspection of non-metallic components and assemblies.
- It is also suitable for individuals seeking to enhance their inspection skills in industries such as automotive, aerospace, and plastics manufacturing.

COURSE OUTLINE

Day 1: Introduction to Non-Metallic Materials and Inspection Principles

- Overview of non-metallic materials: polymers, composites, ceramics, elastomers.
- Manufacturing processes for non-metallic components.
- Introduction to inspection: purpose, types (visual, dimensional, NDT).
- Quality management systems and standards (ISO 9001, AS9100).
- Safety practices in inspection environments.

Day 2: Material Properties and Defect Mechanisms

- Mechanical properties: strength, stiffness, hardness, toughness.
- Thermal properties: glass transition temperature, thermal expansion.
- Defect mechanisms: voids, cracks, delamination, inclusions.
- Effects of moisture, UV, and chemical exposure.
- Case studies of material failures.

Day 3: Visual Inspection Techniques

- Principles of visual inspection.
- Tools: borescopes, magnifiers, mirrors, gauges.
- Lighting techniques for different materials.
- Acceptance criteria for surface defects.
- Recording and reporting visual results.

Day 4: Dimensional Inspection and Measurement

- Measurement tools: callipers, micrometres, height gauges, CMM.
- Reading engineering drawings and GD&T; symbols.
- Measurement uncertainty and calibration.
- Data collection and analysis.
- Introduction to SPC and control charts.

Day 5: Ultrasonic Testing (UT) Fundamentals

- Principles of ultrasonic testing.
- Transducers and couplants for non-metallic materials.
- Calibration using reference standards.
- Flaw detection and sizing.
- Advantages and challenges for composites and polymers.

Day 6: Ultrasonic Testing Practical Application

- Hands-on UT scanning techniques.
- Thickness measurement on non-metallics.
- Detecting delaminations, voids, and disbonds.
- Using DGS/AVG diagrams.
- Practical exercises with composite panels.

Day 7: Radiographic Testing (RT) Principles

- Basic physics of radiography.
- Film and digital radiography systems.
- Image quality indicators (IQI).
- Safety: ALARA, dosimetry, shielding.

- Interpretation of porosity, inclusions, cracks.

Day 8: Radiographic Testing Practical

- Hands-on exposure setup for composites.
- Film processing or digital image acquisition.
- Viewing conditions and interpretation.
- Reporting defects per standards.
- Practical exercises with various thicknesses.

Day 9: Liquid Penetrant Testing (PT)

- PT process: pre-cleaning, application, dwell, removal, developer.
- Types of penetrants: visible, fluorescent.
- Surface preparation for non-metallics.
- Evaluation of indications.
- Safety and environmental considerations.

Day 10: Magnetic Particle Testing (MT) and Eddy Current Testing (ET)

- MT principles and limitations for non-ferrous.
- Eddy current theory and probe selection.
- ET for carbon fibre composites.
- Conductivity measurements.
- Case studies: detecting impact damage.

Day 11: Thermography and Shearography

- Infrared thermography: heat sources, cameras.
- Detecting delaminations and moisture ingress.
- Shearography: laser interferometry.
- Vacuum and thermal stressing.
- Practical demonstrations.

Day 12: Acoustic Emission Testing (AE) and Leak Testing

- AE sources in composites: matrix cracking, fibre breakage.
- Sensor placement and frequency selection.
- Leak testing methods: bubble, pressure decay, tracer gas.
- Data analysis and source location.
- Applications in pressure vessels and piping.

Day 13: Mechanical Testing and Destructive Evaluation

- Tensile testing of polymers and composites.
- Flexural and compression tests.
- Hardness tests: Shore, Barcol.
- Specimen preparation and conditioning.
- Correlation with NDT data.

Day 14: Inspection of Composite Assemblies

- Bondline inspection using UT and thermography.
- Bolt torque verification and hole quality.
- Honeycomb core: water ingress, crush.
- Adhesive joint evaluation.
- Practical inspection of a composite assembly.

Day 15: Inspection of Polymer and Elastomeric Components

- Moulding defects and their causes.
- Dimensional checks on plastic parts.
- Elastomer testing: compression set, ozone resistance.
- Visual and UV inspection for cracks.
- Standards: ASTM, ISO, SANS.

Day 16: Ceramic and Glass Inspection

- Ceramic defects: porosity, cracks, inclusions.
- Ultrasonic testing of ceramics.
- Polariscope for glass stress analysis.
- Weibull statistics for brittle materials.
- Practical inspection of ceramic insulators.

Day 17: Documentation, Reporting, and Traceability

- Inspection report structure and content.
- Non-conformance reports (NCR) and corrective actions.
- Traceability: batch numbers, serialisation.
- Digital documentation systems.
- Legal and contractual implications.

Day 18: Quality Management and Auditing

- ISO 9001 and AS9100 requirements for inspection.
- Audit planning and checklists.
- Corrective and preventive actions.
- Personnel certification (PCN, ASNT).
- Laboratory accreditation (ISO 17025).

Day 19: Advanced Applications and Emerging Technologies

- Computed tomography (CT) for internal structures.
- Phased array ultrasonic testing (PAUT).
- Laser ultrasonics and air-coupled UT.
- Robotic inspection systems.
- Industry 4.0 and data analytics.

Day 20: Integrated Practical Assessment and Course Review

- Practical assessment: inspect a composite component using UT, PT, and visual.
- Dimensional measurement and report writing.
- Oral review of findings.
- Course summary and Q&A;
- Feedback and certification guidance.

ASSESSMENT & CERTIFICATION

Delegates are assessed through exercises and a final test. A mark of **50% or above** earns an **AATICD Certificate of Completion**, issued digitally with a unique verification code. This course carries **28 NQF credits** at **NQF Level 4**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 74,200.00	R 74,200.00
1	In-House	R 96,500.00	R 96,500.00
1	On-Campus (Pretoria)	R 111,300.00	R 111,300.00

UPCOMING SESSIONS

Start	End	Method	Venue
04 Aug 2026	07 Sep 2026	On-Campus	Cape Town, South Africa
05 Aug 2026	08 Sep 2026	On-Campus	Dubai, UAE
06 Aug 2026	09 Sep 2026	On-Campus	Pretoria, South Africa
06 Aug 2026	09 Sep 2026	On-Campus	Lagos, Nigeria
07 Aug 2026	10 Sep 2026	On-Campus	Johannesburg, South Africa
10 Aug 2026	11 Sep 2026	On-Campus	Cape Town, South Africa
11 Aug 2026	14 Sep 2026	On-Campus	Dubai, UAE
12 Aug 2026	15 Sep 2026	On-Campus	Pretoria, South Africa

Contact us if no suitable date is listed – on-demand sessions can be arranged for groups.

HOW TO GET A QUOTE OR APPLY

- 1. Get an instant quotation online:** visit www.aaticd.co.za, open the page for this course (Unit Standard 120225) and click **Get A Quote / Apply**. Select your training method and number of delegates – your quotation is generated immediately and emailed to you with the course brochure attached.
- 2. Apply by email:** send the course title, your preferred training method (Online, In-House or On-Campus Pretoria), the number of delegates and your preferred dates to apply@aaticd.co.za – our team will reply with a formal quotation.
- 3. Apply by phone or WhatsApp:** call +27 12 004 8389 or WhatsApp +27 65 077 6310 and we will prepare your quotation and reserve your seats.
- 4. Confirm your booking:** accept the quotation and settle the invoice. As soon as payment is confirmed your delegates are enrolled and receive their AATICD LMS login details by email, along with joining instructions for their chosen training method.

Group discounts apply automatically – the more delegates you enrol, the lower the price per delegate. No payment is required to request a quotation.

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