



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

Laser Drilling Techniques For Diamond Impurity Improvement Training

Manufacturing, Engineering and Technology / Fabrication and Extraction

Unit Standard 110225 · NQF Level 3 · 6 Credits · 3 Days

COURSE OVERVIEW

This course provides learners with advanced knowledge and practical skills in laser drilling techniques specifically applied to diamond impurity improvement. It covers the principles of laser interaction with diamond materials, methods to enhance diamond clarity, and quality control measures to ensure optimal results in industrial and gemstone applications.

Category	Manufacturing, Engineering and Technology
Subfield	Fabrication and Extraction
Unit Standard	110225
Accreditation	SAQA Accredited · NQF Level 3 · 6 Credits
Duration	3 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Analyze the physical principles of laser drilling and its effect on diamond impurities.
- Apply laser drilling parameters to improve diamond clarity while minimizing structural damage.
- Evaluate the effectiveness of different laser types and settings for specific impurity types.
- Implement safety protocols and quality control procedures in laser drilling operations.
- Demonstrate proficiency in operating laser drilling equipment for diamond treatment.
- Design a laser drilling process plan for a given diamond impurity scenario.

WHO SHOULD ATTEND

- This course is designed for diamond processing technicians, quality control specialists, and gemologists working in the diamond industry who seek to enhance their expertise in laser-based impurity removal techniques.

COURSE OUTLINE

Day 1: Fundamentals of Laser Drilling and Diamond Impurities

- Overview of diamond crystal structure and impurity types (e.g., nitrogen, hydrogen)
- Introduction to laser drilling: mechanisms and applications
- Laser types used in diamond drilling (e.g., Nd:YAG, femtosecond)
- Key parameters: wavelength, pulse duration, energy, and focus
- Impurity detection methods (e.g., FTIR, photoluminescence)
- Safety standards and personal protective equipment (PPE)
- Case studies: laser drilling for clarity enhancement

Day 2: Advanced Laser Drilling Techniques and Process Optimization

- Parameter optimization: energy density, repetition rate, and scan patterns
- Techniques for selective impurity removal (e.g., targeting nitrogen vacancies)
- Process monitoring: feedback control and in-situ diagnostics
- Defects analysis: thermal stress, micro-cracks, and graphitization
- Post-drilling treatments: annealing and chemical cleaning
- Quality assurance: measuring impurity levels before and after
- Industry standards and certification requirements

Day 3: Practical Integration and Quality Improvement Strategies

- Process design workflow: from impurity assessment to final inspection
- Data-driven optimization: using statistical methods (e.g., DOE)
- Integration with diamond grading systems (e.g., 4Cs)
- Maintenance schedules for laser drilling equipment
- Calibration techniques for energy and beam alignment
- Case studies: improving diamond color and clarity
- Future trends: ultrafast lasers and machine learning

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 **6 NQF credits** at **NQF Level 3**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 17,900.00	R 17,900.00
1	In-House	R 23,300.00	R 23,300.00
1	On-Campus (Pretoria)	R 26,800.00	R 26,800.00

UPCOMING SESSIONS

Start	End	Method	Venue
03 Aug 2026	05 Aug 2026	On-Campus	Pretoria, South Africa
03 Aug 2026	05 Aug 2026	On-Campus	Mauritius
04 Aug 2026	06 Aug 2026	On-Campus	Cape Town, South Africa
04 Aug 2026	06 Aug 2026	On-Campus	Lagos, Nigeria
05 Aug 2026	07 Aug 2026	On-Campus	Dubai, UAE
05 Aug 2026	07 Aug 2026	On-Campus	Johannesburg, South Africa
10 Aug 2026	12 Aug 2026	On-Campus	Abu Dhabi, UAE
10 Aug 2026	12 Aug 2026	On-Campus	Cape Town, 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 110225) 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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