



## Accredited Africa Training Institute for Capacity Development

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### COURSE BROCHURE

# Produce Welded Tube And Pipe Training

Manufacturing, Engineering and Technology / Manufacturing and Assembly

Unit Standard 119058 · NQF Level 4 · 60 Credits · 57 Days

## COURSE OVERVIEW

This course equips learners with the knowledge and practical skills to produce welded tube and pipe in a manufacturing environment. It covers the entire process from material preparation to final inspection, ensuring compliance with industry standards and safety regulations. By the end, learners will be able to set up, operate, and maintain tube and pipe welding equipment effectively.

|                 |                                            |
|-----------------|--------------------------------------------|
| Category        | Manufacturing, Engineering and Technology  |
| Subfield        | Manufacturing and Assembly                 |
| Unit Standard   | 119058                                     |
| Accreditation   | SAQA Accredited · NQF Level 4 · 60 Credits |
| Duration        | 57 days                                    |
| Training Method | Online, On-Campus, In-House                |
| Certificate     | Issued via AATICD LMS – verifiable online  |

## LEARNING OUTCOMES

- Apply safe working practices and identify hazards associated with tube and pipe welding operations.
- Demonstrate the correct setup and adjustment of welding equipment for producing welded tube and pipe.
- Analyze material specifications and select appropriate welding parameters for different tube and pipe sizes.
- Implement quality control measures to inspect welded joints and ensure they meet specified standards.
- Evaluate weld defects and apply corrective actions to maintain product integrity.
- Perform post-weld treatments and finishing processes as required.

## WHO SHOULD ATTEND

- This course is ideal for production operators, welders, and technicians in the metal fabrication industry who are responsible for manufacturing welded tube and pipe.
- It is also suitable for supervisors seeking to enhance their technical understanding of the production process.

## COURSE OUTLINE

### Day 1: Introduction to Welded Tube and Pipe Production

- Overview of the unit standard and course structure.
- Types of tubes and pipes: seamless vs. welded.
- Basic manufacturing processes: forming, welding, sizing.
- Industry applications: structural, fluid transport, automotive.
- Safety regulations and hazard identification.
- Introduction to quality standards (ISO, SANS).
- Roles and responsibilities in a production environment.
- Housekeeping and workplace organisation.

### Day 2: Raw Materials and Material Properties

- Steel grades: carbon, stainless, alloy.
- Mechanical properties: tensile strength, yield, elongation.
- Chemical composition and its effect on welding.
- Material certifications and traceability.
- Handling and storage to prevent damage and corrosion.
- Introduction to destructive and non-destructive testing.
- Practical: visual inspection and hardness testing.
- Material selection criteria for specific applications.

### Day 3: Tube and Pipe Forming Processes

- Cold forming vs. hot forming.
- Roll forming process: breakdown, edge preparation.
- Types of forming mills: cage, conventional.
- Tooling design and maintenance.
- Forming defects: edge wave, centre buckle, twist.
- Adjusting roll gaps and pressures.
- Practical: observing a forming line setup.
- Quality checks during forming.

### Day 4: Welding Processes for Tube and Pipe (Part 1)

- Overview of welding processes: ERW, laser, TIG, plasma.
- ERW fundamentals: high-frequency induction and contact welding.
- Welding power sources and controls.
- Impeder and its role.
- Welding parameters: current, speed, pressure.
- Weld defects: cold welds, burn-through, inclusions.
- Practical: setting welding parameters on a simulator.
- Weld inspection basics.

### Day 5: Welding Processes for Tube and Pipe (Part 2)

- Laser welding: principles, beam delivery, focusing.
- TIG welding: gas shielding, tungsten electrodes.
- Plasma welding: keyhole mode, applications.
- Welding process selection criteria.
- Practical: observing laser and TIG welding setups.

- Weld quality attributes for each process.
- Cost and productivity considerations.
- Safety aspects specific to each welding method.

#### **Day 6: Weld Zone and Heat Affected Zone (HAZ)**

- Weld zone: fusion zone, partially melted zone.
- Heat affected zone: grain growth, phase transformations.
- Cooling rates and their effect on hardness.
- Preheat and post-weld heat treatment.
- Microstructural examination using micrographs.
- Practical: preparing and observing weld cross-sections.
- HAZ cracking and mitigation.
- Impact of material thickness on HAZ.

#### **Day 7: Sizing and Straightening**

- Sizing process: reduction, calibration.
- Types of sizing mills: stretch reducing, conventional.
- Die design and wear.
- Straightening principles: roll straightening, press straightening.
- Dimensional tolerances and ovality control.
- Defects: over-sizing, under-sizing, bowing.
- Practical: measuring tube dimensions after sizing.
- Adjusting straightening rolls.

#### **Day 8: Non-Destructive Testing (NDT) Methods**

- Overview of NDT: visual, eddy current, ultrasonic, magnetic particle.
- Eddy current testing: principles, probes, calibration.
- Ultrasonic testing: longitudinal waves, shear waves, flaw detection.
- Practical: operating eddy current and ultrasonic equipment.
- Defect sizing and location.
- Standards for NDT acceptance criteria.
- Limitations of each method.
- Reporting NDT results.

#### **Day 9: Destructive Testing and Mechanical Properties**

- Tensile testing: specimen preparation, yield strength, elongation.
- Flattening test: procedure, acceptance criteria.
- Flaring test: ductility assessment.
- Hardness testing: Rockwell, Brinell, Vickers.
- Practical: conducting tensile, flattening, and flaring tests.
- Bend testing.
- Impact testing (Charpy).
- Correlation between mechanical properties and material specifications.

#### **Day 10: Quality Control and Inspection**

- Quality management systems: ISO 9001, ISO 3834.
- Control plans and inspection checklists.
- In-process inspection: visual, dimensional, NDT.

- Statistical process control (SPC) basics.
- Practical: measuring and recording data.
- Non-conformance reporting and corrective actions.
- Traceability and record keeping.
- Calibration of measuring instruments.

#### **Day 11: Cutting, End Finishing, and Surface Treatment**

- Cutting methods: sawing, abrasive cutting, plasma cutting.
- End finishing: beveling, chamfering, threading.
- Surface treatment: pickling, galvanising, coating.
- Practical: operating a saw and beveling machine.
- Threading: dies and tolerances.
- Inspection of cut ends and surface quality.
- Safety during cutting and finishing.
- Environmental considerations for surface treatment.

#### **Day 12: Welding Procedure Specification (WPS) and Qualification**

- WPS content: parameters, materials, joint design.
- Welding Procedure Qualification Record (WPQR).
- Variables: essential, non-essential, supplementary.
- Practical: reviewing sample WPS and WPQR.
- Qualification testing: tensile, bend, macro.
- Welder performance qualification.
- Importance of WPS in production.
- Compliance with standards (ASME, AWS, SANS).

#### **Day 13: Troubleshooting Common Production Issues**

- Defect classification: surface, dimensional, weld.
- Root cause analysis tools: fishbone, 5 whys.
- Case studies: weld line defects, ovality, surface scratches.
- Practical: troubleshooting simulated defects.
- Adjusting welding parameters to correct defects.
- Roll alignment and tooling wear.
- Material-related issues: inclusions, laminations.
- Documentation of troubleshooting steps.

#### **Day 14: Automation and Process Control**

- Automation levels: manual, semi-automatic, fully automatic.
- Sensors: temperature, speed, position, dimension.
- PLC programming basics: ladder logic.
- Human-machine interface (HMI).
- Practical: interacting with a mill control system.
- Closed-loop control for welding and sizing.
- Data acquisition and logging.
- Maintenance of automation components.

#### **Day 15: Maintenance and Tooling Management**

- Preventive maintenance: daily, weekly, monthly tasks.

- Tooling inspection: rolls, dies, welding contacts.
- Tooling materials and coatings.
- Practical: inspecting and measuring tooling.
- Tooling storage and handling.
- Tooling life cycle: monitoring usage, refurbishment, replacement.
- Maintenance records and planning.
- Safety during maintenance activities.

#### **Day 16: Environmental and Safety Compliance**

- Environmental legislation: NEMA, air quality, water use.
- Waste management: scrap metal, cutting fluids, coatings.
- Spill response and containment.
- Practical: conducting a risk assessment.
- Safety checklists for specific tasks.
- Lockout/tagout procedures.
- Personal protective equipment (PPE) review.
- Emergency response plans.

#### **Day 17: Production Planning and Scheduling**

- Production planning: order processing, lead times.
- Material requirements planning (MRP).
- Practical: creating a production schedule.
- Capacity planning: machine and labour.
- Production monitoring: downtime, speed, yield.
- Efficiency metrics: OEE, scrap rate.
- Corrective actions for delays.
- Communication with other departments.

#### **Day 18: Customer Specifications and Product Testing**

- Common customer specifications: ASTM, API, EN.
- Reading and interpreting specification requirements.
- Practical: testing a product against a specification.
- Mill test certificates and traceability.
- Handling customer complaints: root cause, corrective action.
- Continuous improvement from feedback.
- Communication with customers.
- Regulatory compliance for export.

#### **Day 19: Integrated Practical Project**

- Project briefing: material, dimensions, specifications.
- Team roles and responsibilities.
- Setting up the forming, welding, and sizing line.
- Running production: monitoring parameters.
- In-process inspections and adjustments.
- Final product testing: dimensional, NDT, mechanical.
- Troubleshooting any issues.
- Project debrief and lessons learned.

### Day 20: Assessment and Course Review

- Written assessment covering theory.
- Practical assessment: set up, weld, inspect.
- Oral questioning on process understanding.
- Portfolio of evidence review.
- Course evaluation and feedback.
- Certification process and next steps.
- Career pathways in tube and pipe manufacturing.
- Closing remarks and distribution of certificates.

## 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 **60 NQF credits** at **NQF Level 4**.

## PRICING (PER DELEGATE, EX-VAT)

| Delegates | Training Method      | Price per Delegate | Total        |
|-----------|----------------------|--------------------|--------------|
| 1         | Online               | R 156,200.00       | R 156,200.00 |
| 1         | In-House             | R 203,100.00       | R 203,100.00 |
| 1         | On-Campus (Pretoria) | R 234,300.00       | R 234,300.00 |

## UPCOMING SESSIONS

| Start       | End         | Method    | Venue                   |
|-------------|-------------|-----------|-------------------------|
| 07 Aug 2026 | 26 Oct 2026 | On-Campus | Mauritius               |
| 10 Aug 2026 | 27 Oct 2026 | On-Campus | Dubai, UAE              |
| 11 Aug 2026 | 28 Oct 2026 | On-Campus | Pretoria, South Africa  |
| 12 Aug 2026 | 29 Oct 2026 | On-Campus | Abu Dhabi, UAE          |
| 13 Aug 2026 | 30 Oct 2026 | On-Campus | Durban, South Africa    |
| 13 Aug 2026 | 30 Oct 2026 | On-Campus | Mauritius               |
| 14 Aug 2026 | 02 Nov 2026 | On-Campus | Cape Town, South Africa |
| 17 Aug 2026 | 03 Nov 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](http://www.aaticd.co.za), open the page for this course (Unit Standard 119058) 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](mailto: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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