

# Welding Techniques – Principles and Applications

## OVERVIEW

This Welding Techniques – Principles and Applications course provides a comprehensive understanding of modern welding processes, joint design, and quality control, tailored for engineers, technicians, supervisors, and aspiring welders. Delivered entirely through theory, the course covers SMAW (Stick), GMAW (MIG), and GTAW (TIG) welding processes, welding parameters, joint preparation, defect prevention, and industry standards. Participants gain the knowledge needed to select appropriate welding techniques, understand metallurgical principles, ensure weld quality, and apply health, safety, and environmental best practices.

Ideal for South African industrial contexts, the course equips professionals with the expertise to oversee welding operations, improve workplace safety, and meet CPD requirements without the need for hands-on welding.

## LEARNING OUTCOMES

By the end of this course, learners will be able to:

- Explain the principles of major welding processes: SMAW, MIG/GMAW, TIG/GTAW
- Describe welding joint types and preparation techniques
- Understand welding parameters and their effects on weld quality
- Identify common welding defects and ways to prevent them
- Explain quality control and inspection techniques
- Apply health, safety, and environmental best practices in welding
- Relate welding principles to practical applications in South African industries

## WHO SHOULD ATTEND

- Welding Managers
- Welding inspection personnel
- Welding supervisor personnel
- Project/Design Engineers
- Metallurgists
- Quality Control Technicians
- Quality Assurance Personnel
- Sales Professionals
- Purchasing Agents
- Project Managers/ Supervisors
- All personnel involved with welded fabrication

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## Introduction to Welding Techniques

- Definition of welding and joining
- Evolution of welding technology
- Role of welding in industrial fabrication
- Welding terminology and symbols

## Welding Processes

1. **SMAW / Stick Welding**
  - Principles, consumables, electrode selection
  - Applications in construction and maintenance
2. **GMAW / MIG Welding**
  - Wire and shielding gas selection
  - Process types: short-circuit, spray, pulsed
  - Industrial applications
3. **GTAW / TIG Welding**
  - Principles and filler metals
  - Material suitability (stainless steel, aluminium)
4. **Other Advanced Techniques (Overview)**
  - Laser, plasma, electron beam, friction stir welding
  - Applications in automotive, aerospace, and fabrication

## Welding Joints and Preparation

- Types of weld joints (butt, lap, T-joint, corner, edge)
- Edge preparation and fit-up
- Welding positions and sequence theory
- Effect of preparation on weld quality

## Welding Parameters and Heat Effects

- Temperature and current control principles
- Travel speed and electrode angle considerations
- Heat-affected zone (HAZ) theory
- Distortion and stress considerations

## Welding Defects and Quality Control

- Common defects (porosity, cracking, undercut, lack of fusion)
- Causes and prevention (conceptual)
- Visual inspection principles
- Overview of standards: SANS, ISO, AWS

## Health, Safety, and Environmental Practices

- Welding hazards and risks
- Personal protective equipment (PPE) theory
- Fire prevention and ventilation principles
- Sustainable welding practices

# Welding Techniques – Principles and Applications

Live Online Training | 12 – 13 March 2026



**Booking Contact (Approving Official) Mr/Mrs/Ms**

Full Names: \_\_\_\_\_

Company name: \_\_\_\_\_

Direct Tel No: \_\_\_\_\_ E-mail: \_\_\_\_\_ Fax: \_\_\_\_\_

VAT No: \_\_\_\_\_

Address: \_\_\_\_\_

Signature \_\_\_\_\_

Person Responsible for Finance: \_\_\_\_\_ Direct Tel No: \_\_\_\_\_ Date of Payment: \_\_\_\_\_

## BANKING DETAILS:

## THIS INVESTMENT INCLUDES:

Independent Training Management Pty Ltd  
Bank: FNB South Africa  
Account Number: 62685879276  
Branch Code: 251650  
Branch: Randburg

## THE FOLLOWING HEREBY CONFIRM ATTENDANCE TO THE WORKSHOP

Delegate1: Names \_\_\_\_\_

Position: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Delegate 2: Names \_\_\_\_\_

Position: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Delegate 3: Names \_\_\_\_\_

Position: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Delegate 4: Names \_\_\_\_\_

Position: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Delegate 5: Names \_\_\_\_\_

Position: \_\_\_\_\_ E-Mail: \_\_\_\_\_

*All fees are current at the time of going to print; however, we reserve the right to change them.*

### 2. Additional Delegate Rates:

*Additional delegate rates apply when bookings are made at the same time on the same course.*

### 3. Confirmation Instructions:

*On receipt of this submitted booking form and payment or purchase order you will receive a confirmation letter by email confirming your participation in the training event. This includes a location map with directions and venue details and starting times.*

### 4. Attendance:

*Please note that no learner will be permitted to attend any training course without proof of payment or an order no.*

### 5. Delegate Substitution:

*Substitutes can be made at any time without incurring a penalty. Please inform us in writing so we can make the necessary arrangements for the new learner.*

### 6. Payment:

*Payment can be made by cheque or by electronic transfer, and must be received 5 working days prior to the commencement of the course.*

*Please quote the reference number from your invoice and organisation name so that payments can be tracked. All cancellations must be done in writing and emailed directly to Independent Training. Management Inform us immediately if you have to re-schedule or cancel the booking so that we can inform the caterers and conference venue.*

### The following charges apply if you cancel:

- 11 - 30 days before a course = 10% of the course fee
- 6 – 10 days before a course = 20% of the course fee
- 4 – 6 days before a course = 30% of the course fee
- 1-3 days before a course = 50% of the course fee