



8474  
BASIC GMAW (MIG)  
PROCEDURES (11B)

30S/30E/30M

A Welding Technology Course



# 8474 BASIC GMAW (MIG) PROCEDURES (11B) 30S/30E/30M

## Course Description

This course is intended for students who are considering a career in welding. The emphasis is on hands-on basic flat GMAW (MIG) welding procedures.

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### **Goal 1:** Describe and apply **health and safety** practices.

#### **GLO 1.1:** Demonstrate adherence to **safe practices** and **procedures**.

- SLO 11B.1.1.1 Demonstrate adherence to safe practices and procedures for facilities, processes, tools, and equipment.
- SLO 11B.1.1.2 Identify safety and health requirements. (A1.1)
- SLO 11B.1.1.3 Identify personal protective equipment (PPE) and PPE procedures. (A1.2)
- SLO 11B.1.1.4 Identify electrical safety. (A1.3)
- SLO 11B.1.1.5 Identify fire safety. (A1.4)
- SLO 11B.1.1.6 Identify ergonomics. (A1.5)
- SLO 11B.1.1.7 Identify hazard recognition and control. (A1.6)
- SLO 11B.1.1.8 Identify safety requirements as they apply to WHMIS. (A1.9)
- SLO 11B.1.1.9 Describe the identification and control of specified hazards. (A1.10)
- SLO 11B.1.1.10 Identify hazards and describe safe work practices pertaining to welding. (D1A.3)
- SLO 11B.1.1.11 Read, interpret, and communicate safety information (e.g., MSDS sheets, etc.).
- SLO 11B.1.1.12 Safely store and handle compressed gas tanks.
- SLO 11B.1.1.13 Demonstrate an awareness of hazards related to compressed gas.
- SLO 11B.1.1.14 Demonstrate the safe use of compressed air.
- SLO 11B.1.1.15 Demonstrate an understanding of and adherence to *Safe Work Procedures/Job Hazards Analysis* documents for each piece of equipment used.
- SLO 11B.1.1.16 Demonstrate the safe use of a plasma arc cutter.
- SLO 11B.1.1.17 Identify first aid/cardiopulmonary resuscitation (CPR). (A1.8)
- SLO 11B.1.1.18 Describe the hazards of confined space entry. (A1.7)

SLO 11B.1.1.19 Identify hazards and describe safe work practices pertaining to GMAW welding. (D6.2)

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**GLO 1.2:** Demonstrate knowledge of the *Trade Safety Awareness Curriculum for Level 1 Apprentices*.

No applicable SLOs.

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**Goal 2:** Demonstrate an understanding of **metallurgy**.

**GLO 2.1:** Demonstrate an understanding of **metallurgy** as it applies to welding.

- SLO 11B.2.1.1 Demonstrate an understanding of metallurgy as it applies to basic GMAW welding.
- SLO 11B.2.1.2 Select appropriate filler materials to suit base metal.
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**Goal 3:** Demonstrate the **identification, operation, maintenance, and storage** of **equipment, materials, and consumable items**.

**GLO 3.1:** Demonstrate the **identification** and **operation** of equipment, materials, and consumable items.

- SLO 11B.3.1.1 Demonstrate the operation and handling of equipment, tools, materials, products, and consumable items.
- SLO 11B.3.1.2 Identify the considerations when selecting consumables and determining equipment set-up for performing GMAW fillet welds in all positions. (D6.3)
- SLO 11B.3.1.3 Identify GMAW equipment maintenance and troubleshooting.
- SLO 11B.3.1.4 Set up and operate GMAW equipment.
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**GLO 3.2:** Demonstrate the safe and appropriate **maintenance** and **storage** of equipment, materials, and consumable items.

- SLO 11B.3.2.1 Practise the appropriate cleaning, maintenance, and storage of GMAW equipment, tools, materials, products, and consumable items.
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**GLO 3.3:** Demonstrate an awareness of **hoisting, lifting, and rigging** procedures.

No applicable SLOs.

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**GLO 3.4:** Demonstrate an awareness of **access equipment**.

No applicable SLOs.

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**Goal 4:** Demonstrate an understanding of **welding processes** and exhibit competence in those processes.

**GLO 4.1:** Demonstrate **pre-welding** procedures.

- SLO 11B.4.1.1 Identify GMAW welding processes, and describe their characteristics and applications. (D1A.5b)
  - SLO 11B.4.1.2 Prepare material for basic GMAW procedures.
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**GLO 4.2:** Demonstrate **ability to weld**.

- SLO 11B.4.2.1 Define terminology associated with FCAW welding. (D6.b.1)
  - SLO 11B.4.2.2 Perform GMAW welds on mild steel.
  - SLO 11B.4.2.3 Perform FCAW welds on mild steel.
  - SLO 11B.4.2.4 Perform combined GMAW and FCAW welds on mild steel.
  - SLO 11B.4.2.5 Perform MCAW welds on mild steel.
  - SLO 11B.4.2.6 Identify GMAW welding equipment, consumables, and accessories, and describe their applications. (D6.4)
  - SLO 11B.4.2.7 Describe the procedures used to assemble and disassemble GMAW welding equipment. (D6.5)
  - SLO 11B.4.2.8 Describe the procedures used to establish and maintain an arc using GMAW welding equipment. (D6.6)
  - SLO 11B.4.2.9 Describe the procedures and techniques used to deposit a weld bead using GMAW welding equipment. (D6.8)
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**GLO 4.3:** Perform **post-welding** procedures.

- SLO 11B.4.3.1 Perform cleaning procedures (i.e., chipping, grinding) on GMAW welds.
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**GLO 4.4:** **Inspect** and **troubleshoot** welding projects.

- SLO 11B.4.4.1 Inspect and troubleshoot welding projects.
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**GLO 4.5:** Perform **cutting** and **gouging**.

No applicable SLOs.

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**GLO 4.6:** Perform the **Manitoba Welder Practical Examinations**.

No applicable SLOs.

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**Goal 5:** Demonstrate an understanding of **metal design and fabrication**.

**GLO 5.1:** **Design** metal projects.

No applicable SLOs.

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**GLO 5.2:** **Fabricate** metal projects.

SLO 11B.5.2.1 Cut material for intermediate project, following specific measurements, angles, etc.

SLO 11B.5.2.2 Perform accurate material preparation and fit-up for intermediate project.

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**Goal 6:** Describe and apply the transferable **cross-curricular** knowledge and skills.

**GLO 6.1:** Apply knowledge and skills from the **language arts**.

No applicable SLOs.

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**GLO 6.2:** Demonstrate the **mathematics** skills related to welding.

SLO 11B.6.2.1 Solve problems involving fractions. (B3.1)

SLO 11B.6.2.2 Solve problems involving decimals. (B3.2)

SLO 11B.6.2.3 Solve problems involving metric and imperial measure. (B3.4)

SLO 11B.6.2.4 Read, interpret, and communicate welding terminology.

SLO 11B.6.2.5 Read, interpret, and communicate information found on welding materials (e.g., filler rods, electrodes, etc.).

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**GLO 6.3:** Demonstrate knowledge of **other subject areas**.

SLO 11B.6.3.1 Demonstrate an understanding of the uses of electricity in welding (i.e., conductivity, current, voltage, amperage, polarity, AC versus DC).

SLO 11B.6.3.2 Demonstrate an understanding of the states of matter.

SLO 11B.6.3.3 Demonstrate an awareness of welding symbols.

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**Goal 7:** Follow the **ethical** and **legal standards** that pertain to the welding industry.

**GLO 7.1:** Demonstrate an awareness of the **ethical** and **legal expectations** of welders.

SLO 11B.7.1.1 Demonstrate an understanding of the relationship between ethics and employability skills such as creating a respectful workplace and demonstrating a strong work ethic.

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**Goal 8:** Demonstrate **employability skills**.

**GLO 8.1:** Demonstrate **employability skills**.

SLO 11B.8.1.1 Demonstrate problem-solving skills.

SLO 11B.8.1.2 Demonstrate regular attendance and punctuality.

SLO 11B.8.1.3 Demonstrate accountability for their actions.

SLO 11B.8.1.4 Demonstrate adaptability and effort.

SLO 11B.8.1.5 Demonstrate the ability to accept and follow direction and feedback.

SLO 11B.8.1.6 Demonstrate teamwork skills.

SLO 11B.8.1.7 Demonstrate the ability to stay on task and effectively use time.

SLO 11B.8.1.8 Describe effective verbal and non-verbal communication. (A1.a1)

SLO 11B.8.1.9 Demonstrate critical thinking skills.

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**Goal 9:** Demonstrate an awareness of **sustainability** as it pertains to the welding industry.

**GLO 9.1:** Describe the impact of **human sustainability** on the health and well-being of welders.

SLO 11B.9.1.1 Identify sustainability factors that influence human health and well-being for welders.

SLO 11B.9.1.2 Demonstrate an understanding of sustainability factors in the welding industry that affect human health and well-being.

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**GLO 9.2:** Describe the welding industry's **sustainability practices** and impact on the environment.

SLO 11B.9.2.1 Demonstrate an understanding of the appropriate reuse of materials in welding.

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**GLO 9.3:** Describe the **sustainable business practices** within the welding industry.

SLO 11B.9.3.1 Demonstrate an awareness of the importance of working conditions on employee retention.

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**Goal 10:** Demonstrate an understanding of the **structure** and **scope** of welding.

**GLO 10.1:** Describe the **scope** of welding.

No applicable SLOs.

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**GLO 10.2:** Describe **apprenticeship, post-secondary,** and **employment opportunities.**

SLO 11B.10.2.1 Demonstrate an awareness of career opportunities in GMAW welding.

SLO 11B.10.2.2 Demonstrate an awareness of career opportunities in robotic GMAW welding.

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**Goal 11:** Demonstrate an understanding of the **evolution, technological progression,** and **emerging trends** in welding.

**GLO 11.1:** Demonstrate an understanding of the **evolution, technological progression,** and **emerging trends** in welding.

SLO 11B.11.1.1 Research the use of robotics in GMAW welding.

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