



8487

ADVANCED GMAW (MIG)
WELDING PROCESSES AND
PROCEDURES (12A)

40S/40E/40M

A Welding Technology Course

8487 ADVANCED GMAW (MIG) WELDING PROCESSES AND PROCEDURES (12A) 40S/40E/40M

Course Description

This course is intended for students who are intending to pursue a career in welding. The emphasis is on hands-on advanced positional GMAW (MIG) welding procedures.

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

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

- SLO 12A.1.1.1 Demonstrate adherence to safe practices and procedures for facilities, processes, tools, and equipment.
- SLO 12A.1.1.2 Identify safety and health requirements. (A1.1)
- SLO 12A.1.1.3 Identify personal protective equipment (PPE) and PPE procedures. (A1.2)
- SLO 12A.1.1.4 Identify electrical safety. (A1.3)
- SLO 12A.1.1.5 Identify fire safety. (A1.4)
- SLO 12A.1.1.6 Identify ergonomics. (A1.5)
- SLO 12A.1.1.7 Identify hazard recognition and control. (A1.6)
- SLO 12A.1.1.8 Describe the hazards of confined space entry. (A1.7)
- SLO 12A.1.1.9 Identify first aid/cardiopulmonary resuscitation (CPR). (A1.8)
- SLO 12A.1.1.10 Identify safety requirements as they apply to WHMIS. (A1.9)
- SLO 12A.1.1.11 Describe the identification and control of specified hazards. (A1.10)
- SLO 12A.1.1.12 Read, interpret, and communicate safety information (e.g., MSDS, etc.).
- SLO 12A.1.1.13 Safely store and handle compressed gas tanks.
- SLO 12A.1.1.14 Discuss hazards related to compressed gas.
- SLO 12A.1.1.15 Demonstrate the safe use of compressed air.
- SLO 12A.1.1.16 Demonstrate an understanding of and adherence to *Safe Work Procedures Job Hazards Analysis* documents for each piece of equipment that is used.
- SLO 12A.1.1.17 Identify hazards and describe safe work practices pertaining to GMAW welding. (D6.2)

SLO 12A.1.1.18 Demonstrate an understanding of the worker's responsibility to refuse unsafe work.

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

No applicable SLOs.

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

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

SLO 12A.2.1.1 Select appropriate filler materials to suit base metal.

SLO 12A.2.1.2 Demonstrate an understanding of various metals.

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 12A.3.1.1 Demonstrate the safe and appropriate operation and handling of equipment, tools, materials, products, and consumable items used in advanced GMAW welding processes and procedures.

SLO 12A.3.1.2 Identify GMAW welding equipment, consumables, and accessories, and describe their applications. (D6.a.4)

GLO 3.2: Demonstrate the safe and appropriate **maintenance** and **storage** of equipment, materials, and consumable items.

SLO 12A.3.2.1 Practise the cleaning, maintenance, and storage of GMAW equipment, tools, materials, products, and consumable items.

SLO 12A.3.2.2 Describe the requirements and describe the procedures to store consumables used for GMAW fillet welds on low carbon steel plate. (D6.a.5)

GLO 3.3: Demonstrate an awareness of **hoisting, lifting, and rigging** procedures.

No applicable SLOs.

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

No applicable SLOs.

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

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

SLO 12A.4.1.1 Prepare material and equipment for advanced GMAW welding.

GLO 4.2: Demonstrate **ability to weld**.

SLO 12A.4.2.1 Define terminology associated with FCAW welding. (D6.b.1)

SLO 12A.4.2.2 Perform GMAW, FCAW, and MCAW processes.

SLO 12A.4.2.3 Perform combined GMAW and FCAW welds on mild steel.

SLO 12A.4.2.4 Perform the procedures used to perform fillet and groove welds using the MCAW process. (D6.e.6)

SLO 12A.4.2.5 Identify the modes of transfer relating to GMAW welding, and describe their characteristics and applications. (D6.7)

SLO 12A.4.2.6 Describe the procedures used to perform fillet welds on low carbon steel plate in all positions using the GMAW process. (D6.a.6)

SLO 12A.4.2.7 Perform fillet welds on low carbon steel plate in all positions. (D6.a.8)

GLO 4.3: Perform **post-welding** procedures.

SLO 12A.4.3.1 Perform post-welding procedures for advanced GMAW welding.

GLO 4.4: **Inspect** and **troubleshoot** welding projects.

SLO 12A.4.4.1 Inspect and troubleshoot advanced GMAW welds.

SLO 12A.4.4.2 Describe the procedures used to prevent and correct weld faults. (D6.a.7)

GLO 4.5: Perform **cutting** and **gouging**.

No applicable SLOs.

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

No applicable SLOs.

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

GLO 5.1: Design metal projects.

SLO 12A.5.1.1 Interpret information pertaining to GMAW fillet welds found on drawings and specifications. (D6.a.2)

GLO 5.2: Fabricate metal projects.

SLO 12A.5.2.1 Cut, prep, and tack the five basic weld joints.

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

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

SLO 12A.6.1.1 Define terminology associated with GMAW fillet welds. (D6.a.1)

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

SLO 12A.6.2.1 Solve problems involving percentage and ratios. (B3.3)

SLO 12A.6.2.2 Solve problems involving geometric formulas. (B3.5)

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

SLO 12A.6.3.1 Demonstrate an awareness of the use of information and communication technology in creating electronic portfolios and searching for employment.

SLO 12A.6.3.2 Read, interpret, and communicate welding symbols.

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 12A.7.1.1 Demonstrate an understanding of the history of welding certification as it relates to safety in the welding industry.

Goal 8: Demonstrate **employability skills**.

GLO 8.1: Demonstrate **employability skills**.

SLO 12A.8.1.1 Demonstrate problem-solving skills.

SLO 12A.8.1.2 Demonstrate critical thinking skills.

- SLO 12A.8.1.3 Demonstrate regular attendance and punctuality.
- SLO 12A.8.1.4 Demonstrate accountability for their actions.
- SLO 12A.8.1.5 Demonstrate adaptability, initiative, and effort.
- SLO 12A.8.1.6 Demonstrate the ability to accept and follow direction and feedback.
- SLO 12A.8.1.7 Demonstrate teamwork skills.
- SLO 12A.8.1.8 Demonstrate the ability to stay on task and effectively use time in class and shop environments.
- SLO 12A.8.1.9 Demonstrate the ability to communicate respectfully and effectively with teachers and students.

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 12A.9.1.1 Demonstrate an awareness of the long-term health concerns related to welding different types of materials, such as stainless galvanized steels.
- SLO 12A.9.1.2 Research safety concerns related to different types of filler materials.

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

- SLO 12A.9.2.1 Demonstrate an awareness of the impact of welding work sites on the environment.

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

No applicable SLOs.

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

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

- SLO 12A.10.1.1 Demonstrate an awareness of the scope of GMAW (MIG) welding.

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

No applicable SLOs.

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 12A.11.1.1 Demonstrate an awareness of PULSE welding.

SLO 12A.11.1.2 Demonstrate an understanding of the use of lasers for cutting and welding.
