



Western Technical College

## 10442116 Welding - TIG 3

### Course Outcome Summary

#### Course Information

<b>Description</b>	Instruction in tungsten inert gas welding of aluminum sheet and plate in all positions.
<b>Career Cluster</b>	Manufacturing
<b>Instructional Level</b>	Associate Degree Courses
<b>Total Credits</b>	2
<b>Total Hours</b>	54

#### Textbooks

No textbook required.

#### Learner Supplies

Welding sateen jacket, welding work gloves (long leather gauntlet, short leather work gloves), welding helmet, leather cape and sleeves. **Vendor:** To be discussed in class. Required.

Tools: 25' steel tape measure, metal combination square, and scribe. **Vendor:** To be discussed in class. Required.

Six-inch leather steel toed work boots - \$75.00-150.00. **Vendor:** To be discussed in class. Required.

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** Campus Shop. Required.

#### Success Abilities

1. Cultivate Passion: Enhance Personal Connections
2. Cultivate Passion: Expand a Growth-Mindset
3. Cultivate Passion: Increase Self-Awareness
4. Live Responsibly: Develop Resilience
5. Live Responsibly: Embrace Sustainability
6. Live Responsibly: Foster Accountability
7. Refine Professionalism: Act Ethically
8. Refine Professionalism: Improve Critical Thinking
9. Refine Professionalism: Participate Collaboratively
10. Refine Professionalism: Practice Effective Communication

## Course Competencies

### 1. Interpret Weld Procedures Specifications (WPS).

#### Assessment Strategies

- 1.1. Demonstration

#### Criteria

*You will know you are successful when*

- 1.1. you describe the weld joint specified.
- 1.2. you select the material, filler wire, and shielding gas to be used.
- 1.3. you determine the welding process to be used.
- 1.4. you set up the welding machine to produce the weld following the specifications.

#### Learning Objectives

- 1.a. Identify materials used for weld coupons
- 1.b. Discuss different shielding methods.
- 1.c. Determine the shielding being used for the weld
- 1.d. Identify filler wire and characteristics
- 1.e. Determine the filler wire used for the weld
- 1.f. Explore different electrical power options for TIG welding
- 1.g. Determine welding process and electrical characteristics of the weld
- 1.h. Determine the range of parameters allowed for the weld
- 1.i. Explore the importance of adhering to the specified parameter range for the weld

### 2. Prepare welding station for TIG welding on aluminum with Alternating Current (AC).

#### Assessment Strategies

- 2.1. Demonstration

#### Criteria

*You will know you are successful when*

- 2.1. you select the program and/or settings that will allow you to TIG weld with AC.
- 2.2. you connect ground and torch to the correct lugs.
- 2.3. you select, turn on, and set the correct flow rate of the shielding gas.
- 2.4. you connect foot pedal.
- 2.5. you set Amperage, High Frequency, and Balance (if applicable).
- 2.6. you assemble torch with the correct consumables and electrodes.
- 2.7. you troubleshoot any equipment malfunction and take corrective action.

#### Learning Objectives

- 2.a. Identify the characteristics of fillet welds and groove welds on aluminum.
- 2.b. Determine how the applicable weld joints could be fit up to weld fillet welds
- 2.c. Determine how the applicable weld joints could be fit up to weld groove welds

- 2.d. Tack welding technique
- 2.e. Fit up tolerance specifications

### **3. Perform weld inspection on welded aluminum.**

#### **Assessment Strategies**

- 3.1. Demonstration

#### **Criteria**

*You will know you are successful when*

- 3.1. You identify visual weld defects.
- 3.2. You check groove weld reinforcement using a bridge cam gauge.
- 3.3. You perform the applicable destructive testing method.

#### **Learning Objectives**

- 3.a. Find and interpret visual acceptance criteria in the code book
- 3.b. Read a bridge cam gauge
- 3.c. Find and interpret destructive testing acceptance criteria in the code book
- 3.d. Identify common weld defects
- 3.e. Explain causes of common weld defects and how to correct them
- 3.f. Repair visual weld defects

### **4. Produce fillet welds on aluminum using TIG process in all positions for applicable joints.**

#### **Assessment Strategies**

- 4.1. Demonstration

#### **Criteria**

*You will know you are successful when*

- 4.1. You produce fillet welds meet the minimum acceptance criteria on 1F on various joints.
- 4.2. You produce fillet welds that meet the minimum weld standard on 2F on various joints.
- 4.3. You produce fillet welds that meet the minimum acceptance criteria on 3F vertical up on various joints.
- 4.4. You produce fillet welds that meet the minimum acceptance criteria on 4F overhead on various joints.
- 4.5. You perform weld inspections.

#### **Learning Objectives**

- 4.a. Explore hand motion and weld puddle manipulation technique for TIG welding.
- 4.b. Identify how work and travel angles influence the shape of the weld.
- 4.c. Describe how work and travel angles change depending on weld position and joint design.
- 4.d. Identify the effect of gas flow rate on the weld puddle.
- 4.e. Adjust gas flow rate for different positions and joint designs.
- 4.f. Practice a variety of fillet welds on aluminum.

### **5. Produce groove welds on aluminum using TIG process in all positions for applicable joints.**

#### **Assessment Strategies**

- 5.1. Demonstration

#### **Criteria**

*You will know you are successful when*

- 5.1. You produce welds that meet the minimum acceptance criteria of 1G on various joints.
- 5.2. You produce welds that meet the minimum acceptance criteria of 2G on various joints.
- 5.3. You produce welds that meet the minimum acceptance criteria of 3G vertical up on various joints.
- 5.4. you produce welds that meet the minimum acceptance criteria of 4G overhead on various joints.
- 5.5. you perform weld inspection.

#### **Learning Objectives**

- 5.a. Set up pulsed TIG welding.
- 5.b. Explore hand motion and weld puddle manipulation technique for TIG welding.
- 5.c. Describe how work and travel angles influence the shape of the weld.
- 5.d. Identify how work and travel angles change depending on weld position and joint design.
- 5.e. Practice a variety of groove welds on aluminum.

