Welding Technician 3

Exam Information

Exam number
597

Items
48

Points
48

Prerequisites
Welding Technician 1
Welding Technician 2

Recommended course length
One year

National Career Cluster
Manufacturing

Performance standards
Included (Optional)

Certificate available
Yes

Description

The Welding Technician 3 industry certification exam assesses advanced welding skills. It evaluates the processes that prepare learners to apply technical knowledge and skill in the workplace and in project construction. The exam covers the knowledge, attitude, skills, and habits required to perform tasks autonomously and with minimum supervision, including the selection and use of appropriate techniques and equipment.

Exam Blueprint

Standard	Percentage of exam
1. Leadership Development	2%
2. Work-Place Readiness	2%
3. Welding Safety Practices	13%
4. Gas Metal Arc Welding	13%
5. Gas Tungsten Arc Welding	13%
6. Flux Cored Arc Welding	13%
7. Shielded Metal Arc Welding	13%
8. Weld Inspection and Testing	13%
9. Project based in Blueprints	13%
10. Use of CNC equipment	8%

Standard 1

Students will participate in personal and leadership development activities through SkillsUSA or another appropriate career and technical student organization.

Objective 1 Students will use communication skills to effectively communicate with others.

1. Understand when it is appropriate to listen and to speak.
2. Understand and follow verbal and written instructions for classroom and laboratory activities.

Objective 2 Students will effectively use teamwork to respectfully work with others.

1. Identify and understand different roles in working with a team.

Objective 3 Students will use critical thinking and problem-solving skills.

1. Analyze the cause of the problem.
2. Develop a solution to address the problem.
3. Implement the plan.
4. Evaluate the effectiveness of the plan.

Objective 4 Students will be dependable, reliable, steady, trustworthy and consistent in performance and behavior.

1. Set and meet goals on attendance and punctuality.
2. Prioritize, plan and manage work to complete assignments and projects on time.

Objective 5 Students will be accountable for results.

1. Use an achievement chart for activities and behaviors in class that encourages a personal evaluation of classroom performance.
2. File a weekly/bi-weekly written report on progress toward completion of assignments and projects.

Objective 6 Be familiar with the legal requirements and expectations of the course.

1. Be familiar with the course disclosure statement and all requirements for successful completion of the course.
2. Demonstrate workplace ethics, e.g. fair, honest, disciplined.

Standard 1 Performance Evaluation included below (Optional)

Standard 2

Students will participate in work-place readiness activities.

Objective 1 Students will demonstrate employability skills.

1. Use a career search network to find career choices.
2. Write a resume including a list of demonstrated skills.
3. Write a letter of application.
4. Complete a job application.
5. Participate in an actual or simulated job interview.

Objective 2 Participate in a work-based learning experience outside the classroom.

1. Plan and implement a work-based learning experience aligned with their career goal.

Standard 2 Performance Evaluation included below (Optional)

Standard 3

Students will demonstrate appropriate welding safety practices for laboratory and work settings.

Objective 1 Implement safety practices related to welding.

1. Identify, select, and properly use appropriate personal protective equipment (PPE).
2. Verify that all equipment is in good operating condition and that appropriate safety devices are in place and working (e.g., guards in place, tool rests adjusted, etc.).
3. Maintain a neat, well-organized laboratory or shop working area.

Objective 2 Identify fire hazard conditions and actions to take in case of fire.

1. Explain combustion and identify three conditions necessary for it to occur.
2. Describe fire prevention in a welding shop or work site.
3. Explain classes of fires and appropriate extinguishers.

Objective 3 Take appropriate actions in an accident or emergency.

1. Demonstrate the use of simple first aid in an accident with an injury.
2. Locate first aid kits and investigate their contents and use in appropriate settings.
3. Discuss appropriate safety responses in an accident or emergency.

Standard 3 Performance Evaluation included below (Optional)

Standard 4

Students will use the Gas Metal Arc Welding (GMAW) process.

Objective 1 Set up for GMAW operations on carbon steel.

1. Properly set up welding machine.

Objective 2 Properly set up and complete fillet and groove welds in the flat and horizontal position with GMAW process.

1. Use Spray Transfer mode to make 1F (flat position-fillet weld) welds on carbon steel.
2. Use Spray Transfer mode to make 2F (horizontal position-fillet weld) welds on carbon steel.
3. Use Spray Transfer mode to make 1F (flat position-fillet weld) multi-pass welds on carbon steel.
4. Use Spray Transfer mode to make 1G (flat position-groove weld) welds on carbon steel.
5. Use Spray Transfer mode to make 2G (horizontal position-groove weld) welds on carbon steel.

Standard 4 Performance Evaluation included below (Optional)

Standard 5

Students will use the Gas Tungsten Arc Welding (GTAW) process.

Objective 1 Set up for GTAW operations on carbon steel.

1. Properly set up welding machine.

Objective 2 Properly set up and complete fillet and groove welds in the horizontal and vertical position with GTAW process.

1. Make 3F (vertical position-fillet weld) welds on carbon steel.
2. Make 2G (horizontal position-groove weld) welds on carbon steel.
3. Make 3G (vertical position-groove weld) welds on carbon steel.
4. Perform GTAW welder performance qualification test on carbon steel.

Standard 5 Performance Evaluation included below (Optional)

Standard 6

Students will use the Flux Cored Arc Welding (FCAW) process.

Objective 1 Set up for FCAW operations on carbon steel.

1. Properly set up welding machine.

Objective 2 Properly set up and complete fillet and groove welds in the vertical and horizontal position with FCAW process.

1. Make 3F (vertical position-fillet weld) welds on carbon steel.

2. Make 2G (horizontal position-groove weld) welds on carbon steel.
3. Make 3G (vertical position-groove weld) welds on carbon steel
4. Perform FCAW welder performance qualification test on carbon steel

Standard 6 Performance Evaluation included below (Optional)

Standard 7

Students will use the Shielded Metal Arc Welding (SMAW) process.

Objective 1 Set up for SMAW operations on carbon steel.

1. Properly set up welding machine.

Objective 2 Properly set up and complete fillet and groove welds in the vertical position with SMAW process.

1. Make 3F (vertical position-fillet weld, uphill travel) welds on carbon steel.
2. Make 3G (vertical position-groove weld, uphill travel) welds on carbon steel.
3. Make a 3F (vertical position-fillet weld) multipass welds on carbon steel.
4. Perform SMAW welder performance qualification test on carbon steel.

Standard 8

Students will conduct weld inspection and testing.

Objective 1 Visually inspect metal and welds

1. Visually examine cut surfaces and edges of prepared base metal parts for appropriate preparation and fit.
2. Visually examine tacks, root passes, intermediate layers, and completed welds for penetration and porosity, undercut, bead reinforcement, slag inclusions, and overlap.
3. Suggest appropriate corrective action based on visual inspection results.

Objective 2 Use basic tools to inspect welds.

1. Use basic weld inspection tools including dial calipers, fillet gauges, and weld reinforcement gauge.
2. Suggest appropriate corrective action based on inspection results.

Objective 3 Use mechanical methods to determine weld quality.

1. Perform bend-testing procedures to determine the quality of the weld.
2. Suggest appropriate corrective action based on testing results.

Standard 8 Performance Evaluation included below (Optional)

Standard 9

Students will fabricate a project, made from metal, using a blueprint and welding processes.

Objective 1 Use the following steps to plan a project.

1. Develop a drawing of a project using appropriate welding symbols and information.
2. Create a bill of materials with cost estimates.
3. Use correct techniques to layout project as indicated on blueprints.
4. Accurately measure and prepare materials for fabrication.
5. Prepare a materials order and secure the materials.

Objective 2 Fabricate the project.

1. Construct the project according to a plan that meets high quality standards in four areas, including project design, quality of workmanship, attention to detail, and fit and finish.

Standard 9 Performance Evaluation included below (Optional)

Standard 10

Students will be able to perform automated manufacturing processes using CNC equipment.

Objective 1 Understand and use correct processes to operate CNC equipment.

1. Understand the advantages, disadvantages, and limitations of CNC Plasma Cutting.
2. Understand and apply the concept of X, Y, and Z axis.
3. Understand and apply the concept of Vector and Raster Lines.
4. Define and generate G-Code using drafting software.

Objective 2 Use CNC Plasma Cutter to make a cut.

1. Use a CNC Plasma Cutter to Cut Metal.
2. Create a simple object in a drafting program and successfully cut it.

Standard 10 Performance Evaluation included below (Optional)

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Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance

standard the student must attain a performance standard average of 8 or higher on the rating scale. Students may be encouraged to repeat the objectives until they average 8 or higher.

Student's Name: _____

Class: _____

Performance standards rating scale

0	Limited skills	2	→	4	Moderate skills	6	→	8	High skills	10

Standard 1 – Leadership Development **Score:**

- File a weekly/bi-weekly written report on progress toward completion of assignments and projects.

Standard 2 – Work-Place Readiness **Score:**

- Plan and implement a work-based learning experience aligned with their career goal.

Standard 3 – Welding Safety Practices **Score:**

- Use GMAW Spray Transfer mode to make 2G (horizontal position-groove weld) welds on carbon steel.

Standard 4 – Gas Metal Arc Welding **Score:**

- Perform GTAW welder performance qualification test on carbon steel.

Standard 5 – Gas Tungsten Arc Welding **Score:**

- Perform FCAW welder performance qualification test on carbon steel.

Standard 6 – Flux Cored Arc Welding **Score:**

- Perform SMAW welder performance qualification test on carbon steel.

Standard 8 – Weld Inspection and Testing **Score:**

- Perform bend-testing procedures to determine the quality of the weld.

Standard 9 – Project based in Blueprints **Score:**

- Construct the project according to a plan that meets high quality standards in four areas, including project design, quality of workmanship, attention to detail, and fit and finish.

Standard 10 – Use of CNC equipment **Score:**

- Create a simple object in a drafting program and successfully cut it.

Performance standard average score:

Evaluator Name: _____

Evaluator Title: _____

Evaluator Signature: _____

Date: _____