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# **Welding**

## General Assessment Information

### Blueprint Contents

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**Test Type:** The Welding industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Kansas, Michigan, New York, Oklahoma, Pennsylvania, and Virginia.



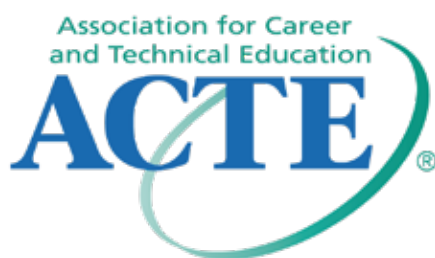
48.0508-  
Welding Technology/Welder



Career Cluster 13 -  
Manufacturing



51-4121.06- Welders, Cutters,  
and Welder Fitters



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!

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## General Assessment Information (continued)



**NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE**  
University of the State of New York - Regents Research Fund

In the lower division  
baccalaureate/associate degree  
category, 3 semester hours in Welding  
Technology or Mechanical Technology.

## Written Assessment

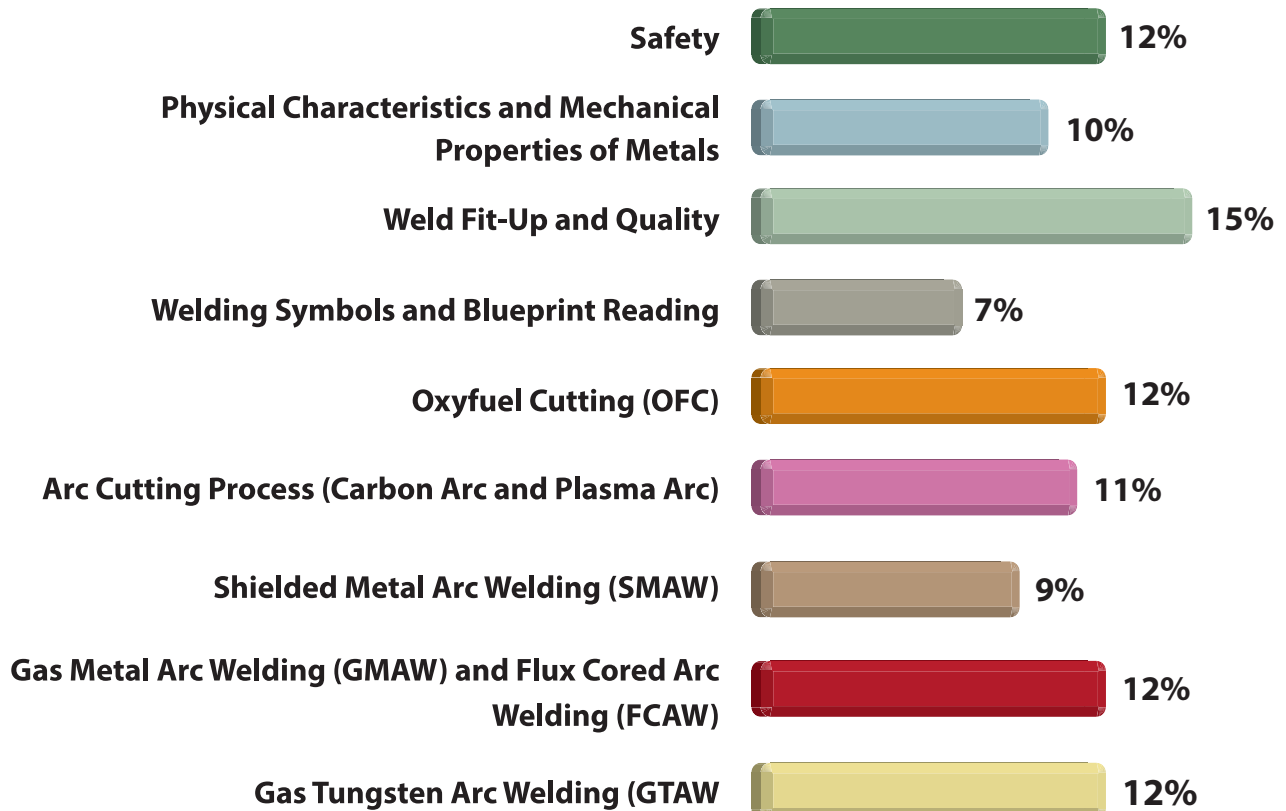
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

**Administration Time:** 3 hours

**Number of Questions:** 172

**Number of Sessions:** This assessment may be administered in one, two, or three sessions.

### Areas Covered



## Specific Standards and Competencies Included in this Assessment

### Safety

- Identify various welding hazards and safe practices
- Display familiarity with industrial and OSHA safety standards
- Demonstrate knowledge of oxyfuel safety procedures
- Demonstrate knowledge of arc welding and cutting safety procedures
- Demonstrate proper and safe use of PPE, hand tools, and power equipment

### Physical Characteristics and Mechanical Properties of Metals

- Identify metals by physical characteristics
- Explain the pre-heating and post-heating processes
- Exhibit understanding of distortion control methods
- Identify basic mechanical properties of metals

### Weld Fit-Up and Quality

- Identify various joint designs (joint geometry) and welding positions
- Clean and prepare materials for groove and fillet welds
- Identify welding defects and/or discontinuities
- Test welds using various techniques
- Use standard measuring and layout tools
- Describe welding industry codes, standards, and procedures

### Welding Symbols and Blueprint Reading

- Interpret weld and welding symbols
- Read and interpret blueprints and sketches

### Oxyfuel Cutting (OFC)

- Identify oxyfuel cutting principles
- Identify and maintain oxyfuel equipment
- Assemble and disassemble oxyfuel equipment
- Handle and store compressed gas cylinders
- Cut and form metal with oxyfuel equipment



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Please note, due to a shift in OSHA terminology, that any references to "Material Safety Data Sheets (MSDS)" will be changed to "Safety Data Sheets (SDS)" during the next scheduled revision.

## Specific Standards and Competencies (continued)

### **Arc Cutting Process (Carbon Arc and Plasma Arc)**

- Identify arc cutting process principles
- Assemble and disassemble arc cutting equipment
- Identify and maintain arc cutting equipment
- Exhibit an understanding of arc cutting consumables
- Demonstrate appropriate use of arc cutting equipment

### **Shielded Metal Arc Welding (SMAW)**

- Explain principles of SMAW
- Set up and maintain SMAW equipment
- Demonstrate selection and application of SMAW consumables
- Perform fillet and groove welds on plate in all positions

### **Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW)**

- Explain principles of GMAW and FCAW
- Set up and maintain GMAW and FCAW equipment
- Demonstrate selection and application of GMAW and FCAW consumables
- Perform fillet and groove welds on plate in all positions

### **Gas Tungsten Arc Welding (GTAW)**

- Explain principles of GTAW
- Set up and maintain GTAW equipment
- Demonstrate selection and application of GTAW consumables
- Perform fillet and groove welds on ferrous and nonferrous metals in all positions

## Sample Questions

**An SDS (Safety Data Sheet) provides detailed information**

- A. about matching the base metal metallurgy with the welding filler metal
- B. about the operating specifications of welding equipment and machinery
- C. regarding appropriate uses of different weld joint geometries
- D. regarding possible hazards resulting from the use of a product

**A neutral oxygen-acetylene flame has a temperature range of**

- A. 230 to 280 degrees Fahrenheit
- B. 500 to 550 degrees Fahrenheit
- C. 3000 to 3500 degrees Fahrenheit
- D. 5800 to 6300 degrees Fahrenheit

**Oxygen cylinders should be \_\_\_\_\_ fuel gas cylinders when not in use.**

- A. stored separately from
- B. chained to
- C. the same color as
- D. at the same pressure as

**In the PAC (Plasma Arc Cutting) process, compressed air must be**

- A. completely dry
- B. moist
- C. lubricated
- D. CO<sub>2</sub>

**Which of the following is a ferrous metal?**

- A. aluminum
- B. copper
- C. magnesium
- D. mild steel

*(Continued on the following page)*

## Sample Questions (continued)

**When welding 3-G certification test weld, the weld must be welded in the \_\_\_\_\_ position.**

- A. vertical
- B. flat
- C. overhead
- D. horizontal

**Which number is the smallest?**

- A. 0.250
- B. 0.500
- C. 0.005
- D. 0.050

**Which condition would cause an electrode holder to overheat?**

- A. loose connection
- B. excessively long cable
- C. insufficient current flow
- D. low voltage

**The \_\_\_\_\_ welding process involves a non-consumable electrode.**

- A. SMAW
- B. GMAW
- C. GTAW
- D. SAW

**Argon and helium gases are**

- A. inert
- B. reactive
- C. neutral
- D. oxidizing



## Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 3 hours

**Number of Jobs:** 6

### Areas Covered:

#### 23% Oxyfuel Cutting

Participant will select and set up equipment correctly and safely, lay out the project according to the provided diagram, and cut to specified dimensions.

#### 20% SMAW V-Groove, 3G

Participant will select and set up equipment correctly and safely, tack the steel pieces to the base, and perform three weld passes in a V-groove according to specifications.

#### 12% GMAW, 2F

Participant will select and set up materials correctly and safely, and using tubing, steel, and welding wire, weld material according to specifications.

#### 15% Aluminum GTAW Tee Joint, 2F

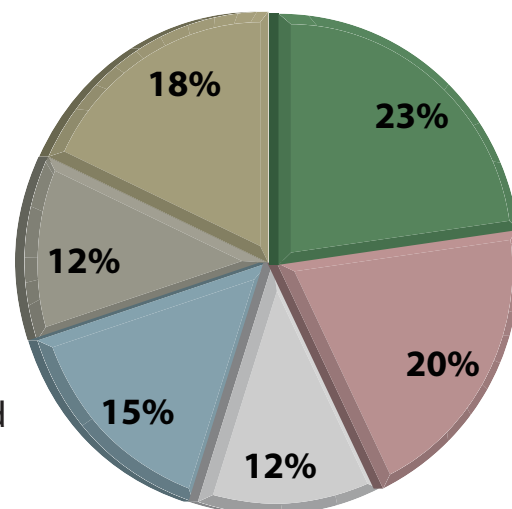
Participant will select and set up equipment correctly and safely, and using aluminum and filler rod, weld a Tee-joint in the horizontal position according to specifications.

#### 12% Stainless Steel GTAW Lap Joint, 2F

Participant will set up equipment correctly and safely, and using stainless steel and filler rod, weld a lap joint according to specification.

#### 18% Uphill FCAW, 3F

Participant will set up equipment correctly and safely, and using mild steel and filler material, weld a root pass and a cap pass according to specifications.



## Sample Job

### Aluminum GTAW Tee Joint, 2F

**Maximum Time:** 20 minutes

**Participant Activity:** The participant will use two pieces of sheet aluminum and filler rod to weld a Tee-joint in the horizontal position.



# Notes

