Experienced Worker Assessment Blueprint

Welding

Test Code: 0121 / Version: 02
Specific Competencies and Skills Tested in this Assessment:

Thermal Cutting Processes
- Cut and form metal with oxyfuel equipment
- Cut materials with arc cutting processes

Basic Heat Treat
- Examine metals visually for identification

Terms/Symbols/Blueprints
- Read and interpret blueprints and sketches
- Read/understand welding symbols

Inspection/Testing Methods
- Clean ferrous and nonferrous metals mechanically and/or chemically for welding
- Prepare plate/pipe for welding
- Use hand tools (hacksaw, files, chisels) to prepare materials
- Use power equipment to wirebrush, buff, sand, drill, grind cut or punch metal
- Set up for welding groove and fillet welds
- Test metals using guided bend tester
- Test metals using tensile testing machine
- Understand/comprehend welding procedures
- Joint design

Components
- Identify electrodes/wires
- Electrode (SMAW) selection

Safety
- Perform all shop tasks to industrial safety standards

Power Source Principles
- Perform routine maintenance on welding and shop equipment
- Check wiring, controls, and battery
- Service starters: manual, recoil, battery, and alternating current
- Electric arc physics
Specific Competencies and Skills continued:

Oxyfuel Welding and Brazing

- Assemble and disassemble oxyfuel portable equipment
- Assemble and disassemble oxyfuel stationary equipment
- Handle and store compressed gas cylinders
- Perform leak test on oxyfuel equipment with approved testing medium
- Set up for welding in the flat, horizontal, vertical and overhead positions
- Adjust parameters and weld ferrous materials with the OFW process
- Braze ferrous and nonferrous materials with TB process
- Set up for welding, brazing, or soldering pipe/tubing joints

Shielded Metal Arc Welding

- Set up for welding in the flat, horizontal, vertical, and overhead positions
- Assemble and disassemble SMAW equipment
- Adjust parameters and weld ferrous materials with the SMAW process

Gas Metal Arc Welding and Flux Cored Arc Welding

- Set up for welding in the flat, horizontal, vertical and overhead positions
- Assemble and disassemble GTAW equipment
- Adjust parameters and weld ferrous materials with GTAW process
- Adjust parameters and weld nonferrous materials with the GTAW process

Gas Tungsten/Arc Measuring Instruments

- Use standard measuring and layout tools

Welding Qualifications and Procedures

- Verification of preheat temperatures

Welding Costs
Written Assessment:

Administration Time: 3 hours
Number of Questions: 184

Areas Covered:

- Thermal Cutting Processes: 3%
- Basic Heat Treat: 5%
- Terms/Symbols/Blueprints: 9%
- Inspection/Testing Methods: 3%
- Components: 6%
- Safety: 5%
- Power Source Principles: 4%
- Oxyfuel Welding and Brazing: 2%
- Shielded Metal Arc Welding: 14%
- Gas Metal and Flux Cored Arc Welding: 20%
- Gas Tungsten Arc Welding: 12%
- Measuring Instruments: 3%
- Qualifications and Procedures: 7%
- Welding Costs: 5%
Sample Questions:

Tensile strength is the resistance a metal has to being
   A. bent
   B. compressed
   C. pulled apart
   D. twisted

Which of the following weld test methods would be most useful in detecting internal defects?
   A. dye penetrant
   B. visual
   C. ultrasonic
   D. magnetic particle

For GMAW - MIG of aluminum and stainless steel, the recommended type welding current is
   A. alternating current high frequency
   B. direct current reverse polarity
   C. direct current straight polarity
   D. direct current straight polarity high frequency

Inert gas is kept flowing after the welding arc is broken in order to
   A. shield the ceramic cup
   B. purge the torch lines of argon
   C. shield the tungsten and the work from contamination
   D. keep the flow meter from freezing up

As a rule, to control cost, speed of construction, and quality of weld, you should
   A. use a ¼-inch electrode for vertical fillet welds
   B. use direct current whenever possible
   C. weld in the flat position whenever possible
   D. do all of the above
Performance Assessment:

Administration Time: 6 hours
Number of Jobs: 10

Areas Covered:

12% Single V Groove with Backing Strip – Test Position 3G
Equipment set-up, material alignment and fit up, following directions, safety, appearance, undercut, overlap, surface porosity, melt-thru of backing, complete joint penetration and root face bend.

12% Single V Groove Pipe Weld – Test Position 5G
Equipment set-up, material alignment and fit up, following directions, safety, appearance, undercut, overlap, surface porosity, melt-thru, undercut, overlap, complete joint penetration and root face bend.

10% Silver Brazing Stainless Steel – Test Position Horizontal (2F)
Equipment set-up, material alignment and fit up, following directions, safety, complete flow through, leg size of fillet, length of fillet and finished appearance.

10% T-Joint Fillet Weld – Test Position 2F
Equipment set-up, material alignment and fit up, following directions, safety, appearance, undercut, overlap, surface porosity, fillet weld break test and penetration.

11% Single V Groove Pipe Weld – Test Position 5G
Equipment set-up, material alignment and fit up, following directions, safety, surface porosity, appearance, undercut, overlap, complete joint penetration, root face bend, and melt-thru.

10% T-Joint Fillet Weld on Aluminum – Test Position 3F Vup
Equipment set-up, material alignment and fit up, following directions, safety, surface porosity, appearance, melt-thru, undercut, overlap and fillet weld break test.

10% T-Joint Fillet Weld on Stainless Steel – Test Position 2F
Equipment set-up, material alignment and fit up, following directions, safety, surface porosity, melt-thru, undercut, overlap and appearance.

8% Lap Joint Fillet Weld – Test Position 2F
Equipment set-up, material alignment and fit up, following directions, safety, surface porosity, melt-thru, undercut, overlap and appearance.

8% Weld Bead Removal by Air Carbon Arc Gouging
Equipment set-up, following directions, safety, complete bead removal, finished appearance, width of gouge and slag removal.

9% Oxyfuel Cutting with Cutting Torch
Equipment set-up, finished parts conform to print, following directions, safety, cut tolerance and appearance of cut.
Sample Job: Single V Groove with Backing Strip - Test Position 3G
Welding Process: Shielded Metal Arc Welding (SMAW)

Estimated Job Time: 50 minutes

Participant Activity: The participant is to weld the root pass throughout the entire joint length using the vertical-up direction. Participant should not tack weld on back of test plate. Remaining weld layers are to be made so that a portion of each layer remains visible to the evaluator for inspection upon completion of the job. The cap pass **MUST** be a minimum of 4" long to allow for two bend test specimens to be cut from this section.