

## WELDING

### **APPLIED SKILLS AND KNOWLEDGE**

#### **PERFORM TECHNICAL READING**

- 1 Identify details and specifications
- 2 Follow detailed directions
- 3 Use book mechanics (tables, index, etc.)
- 4 Locate information and problem solve by use of forms
- 5

#### **PERFORM TECHNICAL WRITING**

- 6 Write Technical words accurately
- 7 Spell task related words correctly
- 8 Enter appropriate information and accurately transfer information to forms

#### **APPLY MATHEMATIC CONCEPTS**

- 9 Distinguish between 2 measurement systems (U.S. Customary and SI metric)
- 10 +, -, /, \* , using whole numbers, fractions, mixed numbers, and decimals
- 11 Round off decimals in one or more places
- 12 Use measuring devices to determine size, length, angle, or distance
- 13 Convert mixed number fractions to decimals and vice versa
- 14 Convert SI (Metric) to U.S. (Customary) units, and vice versa
- 15 Identify geometric shapes
- 16 Understand the functions of angles and parts of a circle
- 17 Prepare parts using principals of geometry
- 18 Read and use a U.S. (Customary)/SI (Metric) tape, rule, and square

#### **COMMUNICATE TECHNICAL INFORMATION**

- 19 Follow detailed verbal instructions
- 20 Pronounce key technical words precisely
- 21 Verbalize factual details accurately
- 22 Explain job related messages and problems clearly

### **RELATED SKILLS AND KNOWLEDGE**

#### **BECOME ORIENTED WITH OCCUPATION**

- 23 Become oriented with career paths associated with welding
- 24 Understand the functions and safe use of common hand tools
- 25 Become competent in the operation of selected power tools and equipment

#### **PERFORM METAL CUTTING OPERATIONS USING THE BETENBENDER HYDRAULIC SHEAR (3/8" X 4' mild steel capacity)**

- 26 Perform safety check list
- 27 Adjust rake for thickness of metal
- 28 Set desired part length using gauge stop
- 29 Operate shear using safe practices

#### **PERFORM METAL CUTTING OPERATIONS USING THE GEKA HYDRAULIC SHEAR (60 ton)**

- 30 Perform safety check list
- 31 Set materials hold down
- 32 Operate hydraulic shear using safe practices
- 33 Set up and adjust tool and die for metal punching operations
- 34 Operate metal punch using safe practices

#### **PERFORM DRILLING OPERATIONS USING A DRILL PRESS**

- 35 Perform safety check list
- 36 Set up for drilling operations

37 Operate drill press using safe practices

**PERFORM METAL CUTTING OPERATIONS USING A VERTICAL BAND**

38 SAW (20" throat)

39 Perform safety check list

40 Set up for cutting operations

41 Operate vertical band saw using safe practices

42 Replace band saw blades as needed

**PERFORM METAL CUTTING OPERATIONS USING A HORIZONTAL BAND SAW**

43 Perform safety check list

44 Set up for cutting operations

45 Adjust rate of automatic feed

46 Operate horizontal band saw using safe practices

47 Replace band saw blades as needed

**PERFORM METAL CUTTING OPERATIONS USING A (14")  
PORTABLE CUT-OFF SAW**

48 Perform safety check list

49 Set up for cutting operations

50 Operate portable cut-off saw using safe practices

51 Replace cut-off saw blades as needed

**PERFORM METAL FORMING OPERATIONS USING THE  
ADIRA HYDRAULIC PRESS BRAKE Model QH-6020**

52 Perform safety check list of equipment and accessories

53 Operate hydraulic press brake using safe practices

54 Set up for a variety of bends

55 Make bends on flat bar and plate

**PERFORM METAL GRINDING OPERATIONS USING A PEDESTAL GRINDER**

56 Perform safety checklist of equipment and accessories

57 Operate pedestal grinder using safe practices

58 Grind ferrous metals using pedestal grinder

59 Perform grinder maintenance

**PERFORM METAL FINISHING OPERATIONS USING A PORTABLE HAND GRINDER**

60 Perform safety checklist

61 Operate portable hand grinder using safe practices

62 Replace grinding wheels as necessary

63 Grind metal using portable hand grinder

**PERFORM METAL FINISHING OPERATIONS USING THE 6"  
BELT FINISHING MACHINE**

64 Perform safety checklist of equipment and accessories

65 Operate belt finishing machine using safe practices

66 Replace sanding belts as necessary

67 Perform metal finishing operations

**DEVELOP AWARENESS OF OCCUPATIONAL SAFETY**

68 Follow safe practices

69 Perform housekeeping duties

70 Demonstrate knowledge of ANSI Z49.1

**KNOW ELECTRICAL FUNDAMENTALS**

71 Know AC-DC fundamentals

- 72 Demonstrate polarity set up
- 73 Perform minor troubleshooting
- 74 Practice electrical safety

#### **INTERPRET DRAWING AND WELD SYMBOL INFORMATION**

- 75 Interpret basic elements of a drawing or a sketch
- 76 Recognize and interpret welding symbol information
- 77 Fabricate parts from a drawing or a sketch

#### **ARC WELDING PRINCIPALS AND PRACTICES**

##### **PERFORM SHIELDED METAL ARC WELDING (SMAW)**

- 78 Perform safety inspections of equipment and accessories
- 79 Make minor external repairs to equipment and accessories
- 80 Set up for shielded metal arc welding operations on plain carbon steel
- 81 Operate shielded metal arc welding equipments
- 82 Make fillet welds, all positions, on plain carbon steel, using E6010 and E7018
- 83 Make groove welds, all positions, on plain carbon steel, using E7018
- 84 Perform 2G-3G limited thickness qualification test on plain carbon steel

##### **PERFORM GAS METAL ARC WELDING (GMAW, GMAW-S)**

- 85 Perform safety inspections of equipment and accessories
- 86 Make minor external repairs to equipment and accessories
- 87 Set up for GMAW operations on plain carbon steel
- 88 Short circuit transfer - Operate gas metal arc welding equipment
- 89 Short circuit transfer - Make fillet welds, all positions, on plain carbon steel
- 90 Spray transfer - Make 1F-2F welds on plain carbon steel
- 91 Spray transfer - Make 1G welds on plain carbon steel

##### **PERFORM FLUX CORED ARC WELDING (FCAW-S, FCAW-G)**

- 92 Perform safety inspection of equipment and accessories
- 93 Make minor external repairs to equipment and accessories
- 94 Set up for flux cored welding operations on plain carbon steel
- 95 Operate flux cored arc welding equipment
- 96 Make fillet welds, all positions, on plain carbon steel
- 97 Make groove welds, all positions, on plain carbon steel

##### **PERFORM GAS TUNGSTEN ARC WELDING (GTAW)**

- 98 Perform safety inspection of equipment and accessories
- 99 Make minor external repairs to equipment and accessories
- 100 Set up for GTAW ops on plain carbon steel, aluminum, & stainless steel
- 101 Operate gas tungsten arc welding equipment
- 102 Make fillet welds, all positions, on plain carbon steel
- 103 Make groove welds, all positions, on plain carbon steel
- 104 Make 1F-2F welds on aluminum
- 105 Make 1G welds on aluminum
- 106 Make 1F-3F welds on stainless steel
- 107 Make 1G-2G welds on stainless steel

#### **OXYFUEL CUTTING PRINCIPALS AND PRACTICES**

##### **PERFORM MANUAL OXYFUEL GAS CUTTING (OFC)**

- 108 Perform safety inspection of equipment and accessories
- 109 Make minor external repairs to equipment and accessories
- 110 Set up for manual OFC operations on plain carbon steel
- 111 Operate manual oxyfuel cutting equipment
- 112 Perform straight cutting operations on plain carbon steel
- 113 Perform shape cutting operations on plain carbon steel

- 114 Perform bevel cutting operations on plain carbon steel
- 115 Remove weld metal from plain carbon steel using washing techniques

#### **PERFORM MACHINE OXYFUEL GAS CUTTING (OFC)**

- 116 Make minor external repairs to equipment and accessories
- 117 Perform safety inspection of equipment and accessories
- 118 Set up for machine oxyfuel gas cutting operations on plain carbon steel
- 119 Operate machine oxyfuel gas cutting (track burner) equipment
- 120 Perform straight cutting operations on plain carbon equipment
- 121 Perform bevel cutting operations on plain carbon steel

#### **ARC CUTTING PRINCIPALS AND PRACTICES**

##### **PERFORM AIR CARBON ARC CUTTING AND GOUGING(CAC-A)**

- 122 Perform safety inspection of equipment and accessories
- 123 Make minor external repairs to equipment and accessories
- 124 Set up manual gouging & CAC-A ops on plain carbon steel, aluminum, stainless steel
- 125 Operate manual air carbon arc cutting equipment
- 126 Perform metal removal operations on plain carbon steel

##### **PERFORM HAND PLASMA ARC CUTTING**

- 127 Perform safety inspection of equipment and accessories
- 128 Make minor external repairs to equipment and accessories
- 129 Set up manual PAC operations on plain carbon steel, aluminum, stainless steel
- 130 Operate manual plasma arc cutting equipment
- 131 Perform shape cutting operations on plain carbon steel, aluminum, stainless steel

##### **PERFORM SETUP AND CUTTING OPERATIONS OF THE PLASMA CAM**

- 132 Make parts drawing on computer
- 133 Use correct eye protection
- 134 Transfer parts drawing from computer to Plasma CAM
- 135 Correct broken lines
- 136 Scale Drawing
- 137 Set correct travel speed
- 138 Use correct plasma torch tip for material thickness
- 139 Set correct torch height
- 140 Convert to cut path
- 141 Select appropriate cut sequence
- 142 Cut material

#### **WELDING INSPECTION AND TESTING PRINCIPALS**

##### **USE VISUAL EXAMINATION PRINCIPALS AND PRACTICES**

- 143 Examine cut surfaces and edges of prepared base metal parts
- 144 Examine tack, intermediate layers, and completed welds

##### **146 Complete Portfolio**

##### **147 Complete Mock Job Interview**

#### **PERSONAL QUALITIES**

- 148 Work Effort
- 149 Safety habits
- 150 Work Area Organization
- 151 On Task Behavior
- 152 Responsibility
- 153 Initiative
- 154 Team Work
- 155 Respect

