Oklahoma CTE

Gas Metal Arc Welding (2001)

Adopted 2001

Gas Metal Arc Welder

A. Demonstrate Employability Skills

18. Identify employment opportunities. A.18
19. Identify levels of training recommended for related careers. A.19
20. Understand salary, wages and benefits packages. A.20

Safety

26. Explain the purpose for safety policies. A.26
27. Discuss the role of OSHA and EPA
Locate information in MSDS A.27
28. Participate in OSHA training, if possible
Lock Out/Tag Out
HAZCOM
MSDS
Bloodborne Pathogens A.28
29. Explain the proper steps in reporting an accident or emergency. A.29
30. Explain the hazards associated with specific types of equipment and tools. A.30
31. Perform machine operator safety checks of equipment and accessories, when necessary. A.31
32. Practice tool safety. A.32
33. Describe the types of fire hazards found in the workplace. A.33
34. Discuss electrical hazards. A.34
35. Demonstrate safe use of personal protective equipment. A.35
36. Demonstrate safe material handling techniques
Lifting
Transporting
Storing A.36
37. Understand established first aid procedures. A.37
38. Practice good housekeeping. A.38
39. Comply with company safety policies. A.39

Basic Academic Skills

40. Apply mathematical operations involving whole numbers, fractions, decimals, percentages, mathematical word problems, ratios, etc., when necessary
Addition
Subtraction
Multiplication
Division A.40
41. Apply advanced mathematical operations, when necessary
Algebra
Geometry
Trigonometry
Calculus
Statistical Methods A.41
42. Apply scientific principles, when necessary
Physics
Chemistry A.42
43. Interpret charts, table, and graphs. A.43
44. Apply reading and writing skills, when necessary. A.44

Blueprint Reading

50. Identify basic elements of blueprints
Terms
Components
Symbols A.50

51. Discuss different types of drawings. A.51

52. Interpret drawings
Bill of Materials
Revisions
Tolerances A.52

53. Interpret symbols. A.53

Measurement Tools and Techniques

54. Identify types of measuring instruments. A.54

55. Use appropriate measurement instrument for a measurement task. A.55

56. Read measuring instruments. A.56

57. Identify the appropriate formula and units for a measurement task. A.57

58. Differentiate between English and Metric measurement systems, when necessary. A.58

59. Communicate measurements using proper symbols or words. A.59

B. Interpret Drawing and Welding Symbols and Written Welding Procedures

01. Interpret basic elements of drawing/sketch
Structural members
Sequence of assembly
Dimensions and tolerances
Scale
View interpretation
List of materials B.01

02. Interpret welding symbol information
Type of weld required
Filler metal
Special details
Non-destructive testing requirements B.02

03. Interpret written welding procedures
Procedure ID number crossreferencing to drawing
Appropriate welding process/base materials/filler materials
Appropriate machine settings B.03

D. Perform Gas Metal Arc Welding (GMAW)

01. Perform safety inspections of equipment and accessories
Protective clothing
Equipment, accessories, and hand tools
Single or mixed shielding gas supply
Work area
Communicate hazard warnings to others D.01

02. Make minor external repairs to equipment and accessories (preventative maintenance only)
Manufacturer's recommendations
Company repair policy
Equipment troubleshooting
Birdnesting
Porosity
Gas leaks D.02

03. Set up for gas metal arc welding operations on plain carbon steel plate
ER70S-X electrodes
Filler metal selection
Proper hand tool selection
Adjust voltage and polarity
Set wire speed
Proper gas flow rate
Parts set up and preheated as necessary
Review appropriate weld
Base metal preparation D.03

04. Operate gas metal arc welding equipment
Short circuit transfer (flat, single pass, multi-pass, multi-directional) fillet weld of plain carbon steel in all positions
Short circuit transfer (flat, single pass, multi-pass, multi-directional) groove weld of plain carbon steel in all positions
Spray transfer (flat, single pass, multipass, and multi-directional) fillet weld of plain carbon steel plate
Spray transfer (flat, single pass, multipass, and multi-directional) groove weld of plain carbon steel in 1G position D.04

05. Short Circuit Transfer: Make fillet welds, all positions, on plain carbon steel in 2F position—flat, multiple pass, multi-directional, surfacing welds. D.05

06. Short Circuit Transfer: Make groove welds, all positions, on plain carbon steel plate with backing in 1G(R) without backing. D.06

07. Spray Transfer: Make 1F-2F welds on plain carbon steel plate
Flat, multi-directional
.035 or .045 diameter E70S-X electrodes
Argon/2%–5% Oxygen shielding gas D.07

08. Spray Transfer: Make 1G welds on plain carbon steel plate with backing. D.08

K. Perform Welding Inspection and Testing

01. Examine cut surfaces and edges of prepared base metal parts
Appearance
Uniformity
Proper fit-up
Base metal preparation K.01

02. Examine tack, intermediate layers, and completed welds
Visual check for weld discontinuity and defects to an acceptable criteria
Destructive or non-destructive examination K.02

Flux-Cored Arc Welder

**A. Demonstrate Employability Skills
Safety
Basic Academic Skills
Blueprint Reading
Measurement Tools and Techniques
**

B. Interpret Drawing and Welding Symbols and Written Welding Procedures

01. Interpret basic elements of drawing/sketch
Structural members
Sequence of assembly
Dimensions and tolerances
Scale
View interpretation
List of materials B.01

02. Interpret welding symbol information
Type of weld required
Filler metal
Special details
Non-destructive testing requirements B.02

03. Interpret written welding procedures
Procedure ID number crossreferencing to drawing
Appropriate welding process/base materials/filler materials
Appropriate machine settings B.03

E. Perform Flux-Cored Arc Welding

01. Perform safety inspections of equipment and accessories
Protective clothing
Equipment and hand tools
Equipment and accessories
Shielding gas equipment and accessories
Work area E.01

02. Make minor external repairs to equipment & accessories (preventative maintenance only)
Manufacturer's recommendations
Company repair policy
Equipment troubleshooting
Birdnesting
Worm-holing
Porosity
Gas leaks E.02

03. Set up for flux cored arc welding operations on plain carbon steel plate
Mixed (75% argon/25% CO2) or single (CO2) shielding gas supply
E71T-X (gas-shielded) and E71T-X (self-shielded) electrodes (.045 minimum)
Review appropriate weld procedures
Base metal preparation
Filler metal selection
Proper hand tool selection
Adjust voltage
Set wire speed
Proper gas flow rate
Parts set up and preheated as necessary E.03

04. Operate flux cored arc welding equipment
Flat single pass surfacing welds
Flat multiple pass, multi-directional, surfacing welds
Workmanship E.04

05. Make fillet welds, 1F, 2F, 3F, on plain carbon steel plate. E.05

06. Make groove weld, 1G, 2G, and 3G positions, on plain carbon steel plate with backing. E.06

K. Perform Welding Inspection and Testing

01. Examine cut surfaces and edges of prepared base metal parts
Appearance
Uniformity
Proper fit-up
Base metal preparation K.01

02. Examine tack, intermediate layers, and completed welds
Visual check for weld discontinuity and defects to an acceptable criteria
Destructive or non-destructive examination K.02