Name: _____ Date: _____

Class: _____ Instructor: _____

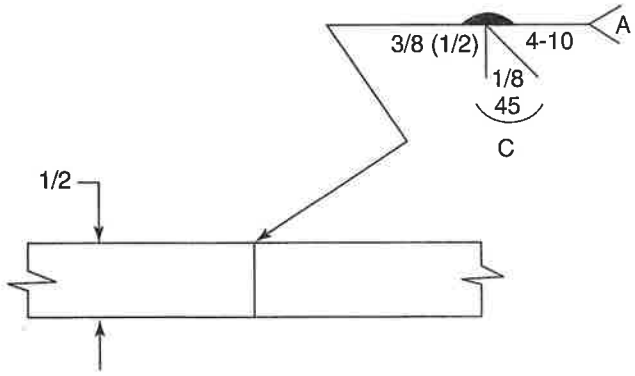
Lesson Grade: _____ Instructor's Initials: _____

Assigned Job 8-1
Reading an AWS Welding Symbol

Objectives:

You will learn to recognize and interpret common AWS welding symbols. You will also learn how to obtain all required information from an AWS welding symbol.

1. Answer the following questions based on the information provided in the welding symbol:



in.	mm
1/8	3.2
3/8	9.5
1/2	12.7

Note A: GMAW, .030 wire.
Use company welding code #24

A. Type of joint: _____

B. Weld root opening size: _____

C. Total groove angle: _____

D. Beveled piece (left or right): _____

E. Weld size: _____

F. Welding process: _____

G. Welding wire diameter: _____

H. Welding code: _____

I. Weld groove depth: _____

J. Continuous or intermittent weld: _____

K. Weld length: _____

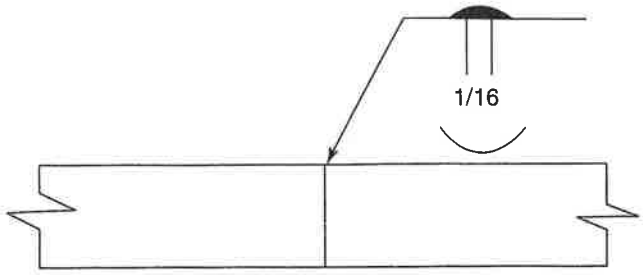
L. Pitch of welds: _____

M. Bead contour shape: _____

N. Weld finish: _____

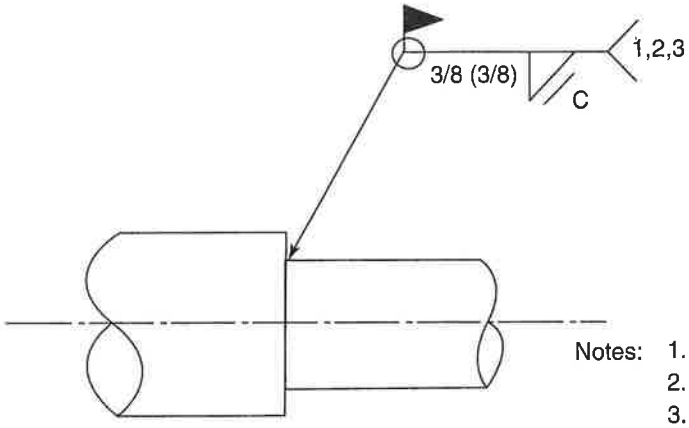
O. What does the melt-through symbol indicate? _____

2. Sketch and dimension the weld described by this welding symbol:



1/16² = 1.6 mm

3. Answer the following questions from the information given on the welding symbol:



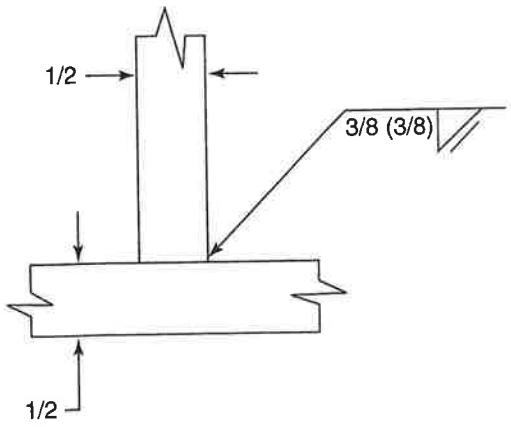
Notes:
1. SMAW
2. E6010, 1/8² (3.2 mm) diameter
3. Shop code #16

3/8² = 9.5 mm

A. Type of weld: _____
B. Weld size: _____
C. Effective throat size: _____
D. Continuous or intermittent weld: _____
E. Bead contour shape: _____
F. Weld finish: _____
G. Welding process: _____
H. Size and type electrode: _____
I. Welding code: _____
J. The circle means: _____
K. Location where weld is performed: _____

Name _____

4. Sketch and dimension the size, shape, and effective throat of the weld described by this welding symbol:



in.	mm
3/8	9.5
1/2	12.7

Inspection:

Recheck the welding symbols against the weld information to ensure that all the answers and drawings are complete and correct.

GENERAL KNOWLEDGE WELDING
WRITTEN EXAM

Section 1 Safety:

1. **Which of the following cylinder storage guidelines is <u>not</u> correct?**
   a. **Cylinders must be stored in well ventilated areas**
   b. **Mark empty cylinders and store them separately**
   c. **Store empty cylinders without a valve cap**
   d. **Store oxygen and fuel gases separately**
   e. **All of the above**

2. **What process produces a clear noise hazard?**
   a. **Gas Metal Arc Welding**
   b. **Resistant Spot Welding**
   c. **Plasma Arc Welding**
   d. **Air Carbon Arc Gouging**
   e. **Oxy/Fuel cutting**

3. **Acetylene becomes unstable above what gauge pressure?**
   a. **15 lbs**
   b. **10 lbs**
   c. **20 lbs**
   d. **30 lbs**
   e. **45 lbs**

4. **Which type of radiation is known to cause arc burn or flash burn?**
   a. **Light Beams**
   b. **Arc Rays**
   c. **Nuclear Rays**
   d. **Ultra Violet Rays**
   e. **Gamma Rays**

5. **Devices that prevent the gases from mixing in the hoses are called?**
   a. **Back stoppers**
   b. **One way check valves**
   c. **Reverse flow check valves**
   d. **Gas valves**
   e. **Needle valves**

6. **Fumes and gases produced during the weld process is a product of all of the following effects upon the base metal <u>except</u>?**

a. Vaporization
b. Oxidization
c. Evaporation
d. Condensation
e. All of the above

7. Protective equipment <u>not</u> suitable for eye protection from welding radiation includes?
   a. Welding helmets with approved filter plates
   b. Clear safety goggles
   c. Protective screens
   d. Properly approved barricades
   e. None of the above

8. A shoulder label on an industrial gas cylinder usually indicates what information?
   a. Chemical composition of the gas and correct PPE
   b. What material the cylinder is made of
   c. Type of gas and manufacturer
   d. Volume of gas in the cylinder
   e. None of the above

9. Which item indicates proper PPE for most welding procedures?
   a. A welding helmet or mask
   b. Safety glasses
   c. Steel toed work boots
   d. Ear plugs or muffs
   e. All of the above

10. A condition that exists when the flame burns back in the torch is called a?
    a. Burnback
    b. Explosion
    c. Reverse flow
    d. Flashback
    e. Mess

SECTION 2 GMAW Process:

11. GMAW designates which process?

a. Gas machine arc welding
b. Gas material arc welding
c. Gas metal arc welding
d. General material arc welding
e. Gas machine atom welding

12. GMAW uses the following current?
    a. DCEP
    b. DCEN
    c. AC
    d. ACHF
    e. ABCD

13. In GMAW the current is determined by the?
    a. Voltage
    b. Shielding gas
    c. Wire feed speed
    d. Machine type
    e. All of the above

14. In GMAW, which type of metal transfer is restricted to flat position and horizontal fillet welds?
    a. Pulsed Transfer
    b. Short Circuit Transfer
    c. Spray Transfer
    d. STT (Surface Tension Transfer)
    e. Globular Transfer

15. What gas would you choose for short circuit transfer welding?
    a. 75% Ar 25% CO2
    b. 100% Ar
    c. 98% O2 2% Ar
    d. 98% Ar 2 % O2
    e. 100% Hydrogen

16. In GMAW, insufficient gas flow can cause?
    a. Undercut
    b. Overlap
    c. Porosity
    d. Hydrogen cracking

17. The welding current is transferred to the wire via the?

a. Conduit
b. Feed rolls
c. Contact tip
d. Liner
e. Ground clamp

18. What type of metal transfer would produce the most spatter?
    a. Short circuiting
    b. Spray
    c. Pulsed
    d. Globular
    e. STT (Surface Tension Transfer)

19. Short circuiting transfer can be used in?
    a. Vertical down flat only
    b. Flat and horizontal only
    c. All positions
    d. None of the above
    e. All of the above

20. When switching from CO2 to Argon/CO2 mix in GMAW short circuit?
    a. It is normal to have to decrease voltage by 1 to 2 volts
    b. More penetration is achieved
    c. The weld produces less spatter
    d. Higher deposition rates are achieved
    e. Both A and C

Section 3 SMAW Process:

21. For an E-7018 electrode the 1 stands for

a. The tensile strength times 10,000 lbs
b. The flux coating
c. The position the electrode can be used in
d. The core wire composition
e. None of the above

22. The SMAW process uses what type of power supply?

a. Constant potential
b. Constant voltage
c. High voltage
d. Constant current
e. All of the above

23. Which of the following electrodes would you select to produce a weld with shallow penetration?

a. E6010
b. E6011
c. E6013
d. E7018
e. E11018

24. When adjusting a SMAW power supply you set the?

a. Voltage
b. Wire speed
c. Amperage
d. Flow rate
e. None of the above

25. "Arc blow" is caused by?

a. Strong winds associated with outdoor welding
b. Magnetic forces associated with direct current
c. Amperage too high for the size of electrode
d. Amperage too low for the size of electrode
e. Shielding gas supply to high

26. An E-7024 electrode can be used in

a. Flat and Horizontal fillets only
b. Vertical down and flat only
c. All positions

d. Flat only
e. None of the above positions

27. A work cable, sometimes reffered to as a ground cable is to provide?
    a. An earth ground for your welding machine
    b. A complete the circuit in the welding process
    c. A machine or chassis ground
    d. A safe path to prevent the operator from being shocked

28. Which of the following welding cable sizes is the largest?
    a. # 1/0
    b. # 2
    c. # 1
    d. # 2/0
    e. # 3

29. The electrode classification that indicates a deep penetrating electrode that can be used with alternating current (AC) is?
    a. E6010
    b. E6011
    c. E6012
    d. E6013
    e. E7024

30. The first two (2) digits of the electrode classification indicate the?
    a. Positions in which the electrode can be used
    b. Minimum tensile strength of the deposited weld
    c. Type of coating and operating characteristics of the electrode
    d. Type of current with which the electrode can be used
    e. Composition of which the electrode is made of

SECTION 4 GTAW Process:

31. GTAW uses what type of gases for shielding?
    a. Active
    b. Inert
    c. A combination of active and inert
    d. Volatile

32. Which of the following methods is used to start the GTAW arc without touching the base metal?
    a. Scratch Start
    b. High Frequency (HF) Start
    c. Pulse Start
    d. Lift Start
    e. Drag Start

33. When using GTAW to weld Aluminum with alternating current (AC), the tip of the tungsten electrode should be?
    a. Tapered to a sharp point
    b. Tapered with the end slightly blunted
    c. Rounded at the tip
    d. Ground at right angles to the grain of the electrode
    e. Ground at left angles to the grain of the electrode

34. What flow rate would be proper when using argon shielding gas?
    a. 10 – 20 cfh
    b. 40 – 50 cfh
    c. 10 – 20 lbs
    d. 40 – 50 lbs
    e. 50 – 60 lbs

35. If tungsten spitting occurs, what may be done to correct the problem?
    a. Change to a different type of tungsten electrode
    b. Use a larger diameter tungsten electrode
    c. Decrease the welding current
    d. All of the above
    e. None of the above

36. The shape of the electrode when using DCEN should be?
    a. Blunt
    b. Balled

c. Tapered
d. Squared

37. Tungsten is used for GTAW electrodes because it has which of the following properties?
    a. High melting point
    b. Low electrical resistance
    c. Good heat conductivity
    d. All of the above
    e. None of the above

38. The recommended tungsten for welding aluminum is?
    a. EWTh-1
    b. EWTh-2
    c. EWTh-3
    d. EWP
    e. TWA-9

39. Which of the following is <u>not</u> an advantage of GTAW?
    a. High quality welds in a great variety of metals
    b. High deposition rate
    c. Very low spatter and post-weld cleanup
    d. All position welding
    e. Un-necessary to pre-clean the base metal

40. What positions can GTAW be used in?
    a. Flat and Horizontal only
    b. Flat only
    c. Vertical and Horizontal
    d. All position
    e. Overhead position only

SECTION 5. General Knowledge / Electrical Knowledge:

41. The wasting away of metal due to atmospheric elements is due to?
    a. Oxidation
    b. Corrosion
    c. Reduction
    d. All of these
    e. None of these

42. The property of metal that resists forces acting to pull it apart is its _____ strength.
    a. Shear
    b. Compressive
    c. Tensile
    d. Impact
    e. Hardness

43. This type of voltage usually presents the highest level of danger from a secondary shock
    a. Constant Voltage
    b. Constant Current
    c. 460 V 3 Phase
    d. Amperage
    e. Open Circuit Voltage

44. One should never operate arc welding equipment while?
    a. In a poorly lighted area
    b. Standing on wet or damp floors
    c. Someone else is close by
    d. In a confined space
    e. Answers B & D

45. A non destructive test method used to detect discontinuities well below the surface is?
    a. Visual
    b. Penetrant
    c. Magnetic particle
    d. Radiography
    e. Eddy current

46. What is the best safe guard against electrical shock?

a. Wear loose fitting clothes
b. Wear dry clothing
c. Insulation
d. Making sure the work piece is grounded
e. All of the above

47. Duty Cycle is based on what unit of time (in the U.S.)?

a. 5 minutes
b. 10 minutes
c. 15 minutes
d. 20 minutes
e. 30 minutes

48. The kind of electricity that reverses the direction of current flow regularly is called?

a. Pulsed
b. Direct
c. Alternating
d. Reversed
e. Positive

49. Amperage in a series circuit should be measured?

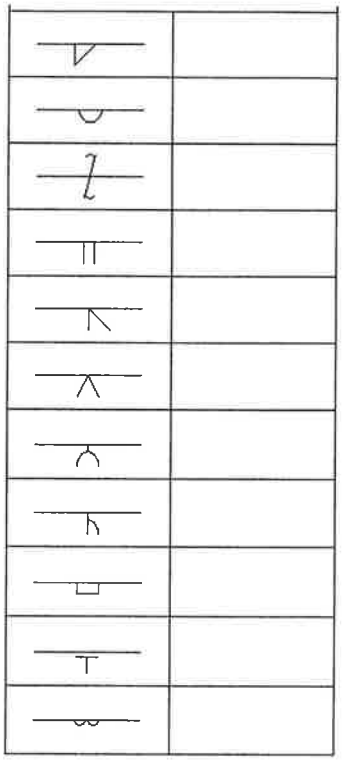
a. At the welding machine
b. At the work lead
c. At the welding Arc
d. Does not matter; Amperage is the same everywhere
e. None of the above

50. Rectifiers are noted for their ability to?

a. Control the welding power
b. Reduce spatter
c. Change from Alternating Current to Direct Current
d. Eliminate Arc Blow
e. Control the shielding gas flow supply

WELD SYMBOLS

Match the correct symbol with the type of weld



1. **Stud**
2. **Single VEE Butt**
3. **Surfacing**
4. **Bead**
5. **Fillet**
6. **Single "J" Butt**
7. **Plug or Slot**
8. **General Butt**
9. **Single "U" Butt**
10. **Single Bevel Butt**
11. **Square Butt**