

Welder Level 2

Welder

Unit: B1 Welding Codes and Job Planning

Level: Two

Duration: 21 hours

Theory: 21 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge and skills of welding codes and job planning. The focus of this unit is Welding codes, standards, and specifications. Beginning with terminology, the unit will review drawings and welding symbols from Level 1. The unit also covers job planning documents, requirements and their procedures. Finally, apprentices will perform material take-off using various types of drawings to interpret and extract information.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with welding codes and job planning.	5%
a. Refer to Welder Red Seal Occupational Standard (RSOS)	
2. Interpret welding symbols, codes and specifications pertaining to welding codes and job planning.	20%
a. Canadian Welding Bureau (CWB)	
b. Canadian Standards Association (CSA)	
c. American Welding Society (AWS)	
d. American Society of Mechanical Engineers (ASME)	
3. Review drawings and welding symbols.	15%
a. Drawings	
• Blueprints	
• Assembly drawings	
• Shop and fabrication drawings	
• Engineered drawings	
b. Views	
• Section	
• Detail	
• Orthographic	
• Isometric	
c. Documentation	
• Codes	
• Specifications	
• Change orders	
• Request for information (RFI)	
d. Drawing conventions	

- Line types
- Reference numbers
- Symbols
- Abbreviations
- Units of measurement (metric/imperial)
- Scaling
- Title block and legend
- Notes, specifications and schedules
- e. Welding Symbols
 - Type of weld
 - Type of joints
 - Size of weld
 - Field or shop weld
 - Contour symbols
 - Finish symbols
 - Reference line, arrow and tail
 - Backing

4. Identify and describe job planning documents, requirements and their procedures. 20%

- a. Work-related documents
 - Time sheets
 - Machinery checklists
 - Progress report sheets
 - Weld maps
 - Dimensional checks
 - Visual weld inspections
 - Incident reports
- b. Reference documentation
 - Bill of materials
 - Welding procedures specifications (WPS)
 - Welding procedures data sheets (WPDS)
 - Material traceability (mill reports)
- c. Job planning requirements
 - Equipment and space
 - Material and supplies
 - Labour
- d. Job planning procedures
 - Determine task requirements
 - Sequence order of operations
 - Schedule jobs and tasks
 - Anticipate safety requirements
 - Coordinate tasks with co-workers and other trades
 - Set up work area
 - Generate cut lists and parts lists

5. Identify and describe codes, standards and specifications, and their applications to drawings and fabrication processes. 20%

- a. Weld certification
 - CWB
 - CSA
 - AWS
 - ASME

- Other
- b. Codes
 - Structural
 - Pipe
 - Pressure vessel
- c. Standards
 - Equipment
 - Methods
 - Procedures
- d. Specifications
 - Product requirements
- e. Tests
 - Non-destructive
 - Destructive
 - Pressure

6. Demonstrate and perform material take-off and job planning using codes and specifications from various types of reference documentation and drawings to interpret and extract information. 20%

- a. Job planning documents
- b. Job planning requirements
- c. Job planning procedures
- d. Weld certification and codes
- e. Interpret and extract information
- f. Generate cut lists and parts lists
 - Material type
 - Dimensions
 - Angles
 - Tolerances
 - Interferences
 - Welding symbols
 - Welding sequence

Welder

Unit: B2 Weld Process and Quality Inspection II

Level: Two

Duration: 28 hours

Theory: 28 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge and skills of weld process and quality inspection. Beginning with terminology and safe work practices, the unit covers the storage of gas cylinders, welding consumables and fundamental start-up and shut-down welding procedures. The unit also covers marking welds, materials and parts, heat treatments, heat effects and the final finishing of parts. Finally, apprentices will describe material testing methods and repair procedures.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with weld process and quality inspection.	5%
a. Refer to Welder Red Seal Occupational Standard (RSOS)	
2. Identify hazards and describe safe work practices of weld process and quality inspection.	5%
a. Welding consumables	
• Burns, lifting, flux dust	
b. Gas cylinder hazards	
• Safety data sheets (SDS)	
• Explosions	
• Displacement of oxygen (asphyxiation)	
c. Final product finishing	
• Cuts and particulate projection/sparks	
• Dust/particulate inhalation and toxic chemicals	
3. Interpret information pertaining to weld process and quality inspection found on drawings, codes, manufacturers' specifications and jurisdictional regulations.	5%
4. Describe the procedures to store welding consumables and gas cylinders.	10%
a. Welding consumables	
• Electrodes	
• Welding wires	
• Welding fluxes	
b. Storage requirements for welding consumables	
• Electrode and flux ovens (portable and stationary)	
• Desired temperature	
• Environmentally controlled area	

- Safety data sheets (SDS)
- c. Damaged consumable products
 - Damaged electrodes
 - Torn bags of flux
 - Unidentified welding consumables
 - Identified and removed from service
- d. Gas cylinder product type and identification
 - Fuel
 - Oxygen
 - Inert
 - Active
- e. Storage and transport requirements for gas cylinders
 - Oxygen kept separate from fuels
 - Ventilation
 - Kept in vertical position
 - Secured with chains
 - Regulatory requirements
 - Damaged gas cylinders removed from service

5. Describe the fundamental procedures for welding equipment start-up and shut down. 10%

- a. Welding process
 - Shielded metal arc welding (SMAW)
 - Flux cored arc welding (FCAW)
 - Metal cored arc welding (MCAW)
 - Gas metal arc welding (GMAW)
 - Gas tungsten arc welding (GTAW)
 - Submerged arc welding (SAW)
- b. Power source
 - Voltage and amperage requirements
 - Polarity
 - Stationary or portable
 - Project and power availability
 - Environmental conditions
- c. Process selection
 - Job requirements and specifications
 - Material type, grade and thickness
 - Drawings
 - Welding procedures specifications (WPS)
 - Welding procedures data sheets (WPDS)
- d. Equipment start-up and shut down
 - Identify damaged equipment and remove from service
 - Verify electrical, gas and air supplies are connected properly
 - Start-up equipment
 - Shut down equipment

6. Describe the procedures to mark welds, material and parts. 10%

- a. Reasons for marking material and parts
 - Traceability
 - Identification for fabrication and erection
- b. Regulatory requirements for marking welds
 - Codes

- Standards
 - Regulations
 - c. Mill test reports (MTR)
 - d. Transfer markings from stock material to cut parts for traceability
- 7. Identify and describe controlling temperature of weldments, their characteristics and applications. 10%**
- a. Heat treatments
 - Annealing
 - Tempering
 - Normalizing
 - Hardening
 - b. Heat treatment methods
 - Ovens
 - Heating coils
 - c. Heat effects
 - Expansion
 - Contraction
 - Distortion
 - Mechanical properties
 - d. Cooling processes
 - Quenching
 - Controlled cooling
 - e. Hardness scales
 - Rockwell
 - Brinell
 - Vickers
- 8. Describe the procedures of controlling temperature of weldments. 10%**
- a. Use tools and equipment
 - b. Determine heating requirements
 - Pre-heat
 - Control of interpass temperature
 - Post-heat applications
 - c. Select and use temperature measuring devices
 - Temperature sticks
 - Thermocouples
 - Pyrometers
 - Infrared (IR) thermometers
 - d. Apply heat and heat effects
 - Expansion
 - Contraction
 - Distortion
 - e. Follow procedures for different alloys
 - f. Maintain pre-heat, interpass and post-weld temperature
 - g. Control cooling rate
 - Insulation
 - Heating coils
 - Ovens
- 9. Describe the procedures to finish the final product. 15%**
- a. Select and use tools and equipment

- Grinders
- Wire wheels
- Buffers
- b. Identify finishes and weld profile
 - Drawings and job specifications
- c. Repair and finish weld discontinuities
 - Porosity
 - Undercut
 - Cold lap
 - Excess or incomplete penetration
- d. Repair and finish surface imperfections
 - Welding spatter
 - Gouges
 - Stray arc strikes
 - Sharp edges
 - Plate clamp gouges
 - Miscellaneous defects
- e. Prepare weldments and other pieces
- f. Chemically clean weldments
 - Oils
 - Oxides
- g. Prepare weldments for galvanizing
 - Air bleeds and drain holes
- h. Label parts for traceability
- i. Sort assemblies for specific finishes
 - Coatings
 - Pickling
 - Machining
 - Blasting

10. Identify and describe quality inspection, their characteristics and applications. 10%

- a. Non-destructive testing methods
 - Radiography
 - Ultrasonic
 - Liquid penetrant
 - Magnetic particle examination
 - Hydro
 - Phased array
- b. Destructive testing methods
 - Bend and tensile strength
 - Etching
 - Impact
 - Hardness
- c. Required measurements
 - Material
 - Weld
 - On-going dimensional
 - Final product
- d. Inspection test plan (ITP)

11. Describe the procedures for quality inspection and repair. 10%

- a. Tool and equipment use

- Measurements to be verified
- b. Non-destructive testing methods
 - Radiography
 - Ultrasonic
 - Liquid penetrant
 - Magnetic particle examination
 - Hydro
 - Phased array
- c. Destructive testing methods
 - Bend and tensile strength
 - Etching
 - Impact
 - Hardness
- d. Repair surface imperfection and material defects
 - Surface irregularities
 - Laminations
 - Surface contamination
- e. Fabrication mitigation and repair methods
 - Improper fit-up
 - Misalignment
 - Distortion
 - Incorrect dimensions and orientation
- f. Weld discontinuities mitigation and repair methods
 - Porosity
 - Undercut
 - Cold lap
 - Excess or incomplete penetration

Welder

Unit: B3 Layout and Fabrication II

Level: Two

Duration: 28 hours

Theory: 14 hours

Practical: 14 hours

Overview:

This unit is designed to provide the apprentice with advanced knowledge and skills associated with layout and fabrication. Beginning with terminology and safe work practices, the unit covers template development and transferring dimensions from drawings to materials. The unit will also cover preparing materials to fabricate, fit and assemble pipe components and identify tacking defects. Finally, apprentices will demonstrate and perform the procedures to preparing pipe to fabricate components.

Objectives and Content:	Percent of Unit Mark (%)
1. Define terminology associated with layout and fabrication. a. Refer to Welder Red Seal Occupational Standard (RSOS) b. Pipe	5%
2. Identify hazards and describe safe work practices with layout and fabrication.	5%
3. Interpret jurisdictional codes and regulations pertaining to pipe and tube. a. Assembling components for pressure vessels	5%
4. Identify and describe template development, transferring dimensions from drawings to materials, their selection, characteristics, applications and procedures. a. Template layout factors <ul style="list-style-type: none"> • Size • Kerf • Seam location • Bend allowances b. Pipe <ul style="list-style-type: none"> • Sizing • Tolerances • Fittings • Centre lines • Hole locations • Flange layout 	10%
5. Identify and describe fitting components for pipe welding, their characteristics, applications, and procedures. a. Types and sizes of tacks	20%

- Bridge
 - Penetrating
 - b. Tacking methods
 - Hi-lo
 - c. Methods to control expansion and contraction
 - Tacking sequence
 - d. Defects
 - Lack of penetration
 - Undercut
 - Lack of fusion
 - Spatter
 - Slag inclusions
 - Cracks
 - Porosity
 - Overlap
- 6. Identify and describe welding component assembly, their selection, characteristics, applications and procedures. 15%**
- a. Tools and equipment
 - Hi-lo gauge
 - Clamps
 - Wedges
 - Alignment tools
 - b. Assembly constraints
 - Building size
 - Equipment limitations
 - c. Assembly sequence
 - d. Set gaps and alignments
- 7. Demonstrate and perform the procedures to preparing pipe to fabricate components. 40%**
- a. Layout
 - Pipe
 - Flange
 - b. Preparation processes
 - Grinding
 - Cutting
 - c. Prepare edge for assembly
 - Square
 - Bevel
 - Land
 - Gap
 - d. Alignment
 - e. Tack method
 - Bridge
 - Penetrating
 - f. Tack weld components
 - g. Repair tack defects

Welder

Unit: B4 Shielded Metal Arc Welding II

Level: Two

Duration: 63 hours

Theory: 14 hours

Practical: 49 hours

Overview:

This unit is designed to provide the apprentice with the knowledge and skills of shielded metal arc welding (SMAW). Beginning with terminology, hazards and safe work practices, the unit covers SMAW specialty electrodes and their characteristics and applications. The unit also covers SMAW set up but will focus on the procedures, principles and techniques for vertical (2G) applications. Finally, apprentices will perform the procedures for SMAW.

Objectives and Content:	Percent of Unit Mark (%)
1. Define terminology associated with shielded metal arc welding (SMAW).	5%
a. Refer to Welder Red Seal Occupational Standard (RSOS)	
2. Identify hazards and describe safe work practices of SMAW.	5%
a. Fumes, electrical shocks, burns and flying debris	
b. Visible light rays, ultraviolet (UV) and infrared light	
Falling objects, falling hazards and fire hazards	
c. Setting equipment operating parameters	
3. Interpret codes, standards, regulations and apply welding symbols and information pertaining to SMAW.	5%
4. Identify and describe SMAW specialty electrodes and their characteristics and applications.	20%
a. Types	
• Aluminum	
• Cast iron	
• Unichrome	
• Hard surfacing	
b. Applications	
• Castings	
• Exhaust manifolds	
• Stud removal	
• Equipment	
• Other	
c. Base metals	
• Pre-heating	

- Post-heating
- Interpass temperature

5. **Describe SMAW welding equipment maintenance.** **15%**
 - a. Equipment
 - b. Components
 - c. Power sources

6. **Describe and demonstrate procedures to set up SMAW equipment for vertical (2G) applications.** **10%**
 - a. Determine parameters
 - WPS/WPDS and application
 - b. Select machine settings
 - Polarity
 - c. Adjust amperage
 - Base metal thickness
 - Electrode type and size
 - d. Connect electrode holders and work lead clamps
 - e. Attach work lead clamp to base metal
 - f. Verify set up
 - Weld test piece of same base metal, electrode and position

7. **Describe and demonstrate the procedures for SMAW vertical (2G) applications** **10%**
 - a. Electrode manipulation techniques
 - Whip
 - Backhand and forehand
 - Weave
 - Stringer
 - b. Electrode
 - Angle
 - Inclination
 - c. Travel speed
 - d. Repair weld discontinuities and defects

8. **Perform the procedures for SMAW.** **30%**
 - a. Groove weld assembly
 - Mild steel
 - 2G
 - 3G
 - E-4310 (E-6010) root
 - E-4918 (E-7018) hotpass, fill and cap
 - b. Groove fillet weld assembly
 - Mild steel
 - 2GF
 - E-4918 (E-7018)

Welder

Unit: B5 Semi-Automatic Wire Feed Welding II

Level: Two

Duration: 63 hours

Theory: 14 hours

Practical: 49 hours

Overview:

This unit is designed to provide the apprentice with the knowledge and skills of semi-automatic wire feed welding. Beginning with terminology, hazards and safe work practices, the unit covers digital welding equipment, techniques and factors for FCAW, MCAW, GMAW and their characteristics, applications and operation. The unit also covers procedures to weld using FCAW, MCAW and GMAW processes for vertical (2G) applications. Finally, apprentices will perform the procedures for semi-automatic welding.

Objectives and Content:	Percent of Unit Mark (%)
1. Define terminology associated with automatic wire feed welding processes.	5%
a. Refer to Welder Red Seal Occupational Standard (RSOS)	
b. Flux core arc welding (FCAW)	
c. Metal core arc welding (MCAW)	
d. Gas metal arc welding (GMAW)	
2. Identify hazards and describe safe work practices of automatic wire feed welding.	5%
a. Burns, electrical burns and electrical shocks	
b. Visible light rays, ultraviolet (UV) and infrared light	
c. Asphyxiation, ozone and phosgene gases	
d. Pinch points, falling objects and moving parts	
3. Interpret jurisdictional codes and regulations pertaining to automatic wire feed welding.	5%
4. Identify and describe digital welding equipment, techniques and factors for FCAW, MCAW, GMAW and their characteristics and applications and operation.	20%
a. Power source for digital welding equipment	
• Constant voltage (CV) capable machines	
• inverters	
• Rectifiers	
• Generator	
• Voltage sensing wire feeder	
b. Digital technology	
• Waveform programming	
• Real-time monitoring	
• Pre-sets	

- c. Wire manipulation techniques
 - Backhand and forehand techniques
 - Bead width and shape (weave and stringer) to direct heat
 - Control penetration and build-up
 - d. Welding factors
 - Base metal
 - Joint configuration
 - Position
 - Heat input
 - WPS/WPDS
- 5. Describe and demonstrate the procedures to weld using FCAW, MCAW and GMAW processes for vertical (2G) applications. 25%**
- a. FCAW, MCAW and GMAW equipment and components
 - Identify damage and defects
 - Required maintenance
 - b. Set-up equipment
 - Set machine settings
 - Set required current type
 - Assemble gun components and connect to wire feeder
 - Connect regulator to gas supply and gas hose to wire feeder
 - Install wire roll in wire feeder
 - Feed wire through drive rolls, liner and gun
 - Clip end of wire for stick-out
 - Adjust wire drive roll tension
 - Attach work lead clamp to base metal
 - Verify setup
 - c. Set operating parameters
 - Determine parameters
 - Set wire feed speed and voltage
 - Set gas flow rate
 - Verify setup
 - d. Performs welds
 - Start-up equipment
 - Start arc and manipulate electrode
 - Perform wire manipulation techniques
 - Perform tacking, backstepping and sequencing techniques
 - Adjust travel speed and angle
 - Stop arc
 - Remove slag using tools
 - Identify weld discontinuities and defects
 - Determine cause of weld discontinuities and defects
 - Repair weld discontinuities and defects
 - Re-start arc
 - Finish weld
 - Shut down equipment
- 6. Perform the procedures for semi-automatic welding. 40%**
- a. FCAW or MCAW (Choice)
 - Mild steel plate
 - 2GF
 - E491T-9 (E71T-1)

- E49C-6 (E70C-6)
 - Diameter = 0.045
- b. GMAW
- Mild steel plate
 - 1G
 - 2G
 - 2GF
 - ER49S-6 (ER70S-6)
 - Diameter = 0.035

Welder

Unit: B6 Gas Tungsten Arc Welding I

Level: Two

Duration: 56 hours

Theory: 21 hours

Practical: 35 hours

Overview:

This unit is designed to provide the apprentice with the knowledge and skills of gas tungsten arc welding (GTAW). Beginning with terminology and safe work practices, the unit covers GTAW equipment, consumables, shielding gas and accessories. The unit also covers the procedures for GTAW set-up, start up and shut down. Finally, apprentices will demonstrate and perform welds using the GTAW processes on mild steel.

Objectives and Content:	Percent of Unit Mark (%)
1. Define terminology associated with gas tungsten arc welding (GTAW). a. Refer to Welder Red Seal Occupational Standard (RSOS)	5%
2. Identify hazards and describe safe work practices for GTAW.	5%
3. Identify and interpret codes, standards and regulations pertaining to welding using the GTAW process.	5%
4. Identify and describe GTAW equipment, consumables and their characteristics, applications, operations and maintenance. a. Power sources • Inverter technology • Polarity settings • Types of currents • Duty cycle b. Equipment controls • High frequency • Square wave controls • AC amperage frequency control • AC balancer • Pulse controls c. Base metal • Thickness • Ferrous and non-ferrous d. Joint type and design e. Tungsten electrode types and color codes • Pure • Thoriated	15%

- Zirconiated
- Lanthanated
- Ceriated
- Rare earth
- f. Filler metals
 - Rods
 - Wire
 - Consumable inserts
 - Tensile strength
 - Position
 - Composition
 - F-numbers
- g. Welding position
- h. Torches
 - Air cooled
 - Liquid cooled
- i. Digital technology
 - Waveform programming
 - Real-time monitoring
 - Pre-sets

5. Identify and describe shielding gas requirements for GTAW.

15%

- a. Types
 - Argon
 - Helium
 - Mixed gases
- b. Selection factors
 - Mild steel
 - Stainless steel
 - Aluminum
 - Specialty materials
- c. Flow rates
 - Pre-flow time
 - Post-flow time
- d. Regulators / flow meters
- e. Purging
 - Pre-purge
 - Post-purge pulse

6. Identify and describe GTAW accessories.

10%

- a. Torch types
 - Air and liquid cooled
 - Size
 - Amperage capacities
 - Gas lenses
 - Collets and collet body
 - Flexible and rigid style
- b. Torch controls
 - Foot controls
 - Torch mounted controls
 - Remote controls

- c. Purging equipment
 - Caps
 - Dams
 - Valves

7. Describe and demonstrate the procedures for GTAW set-up, start up, welding and shut down for mild steel applications. 20%

- a. Material preparation and fit-up
 - Pre-weld cleaning methods
 - Welding position
- b. Polarity
 - DCEN
 - Alternating current
- c. Arc initiation method
 - Scratch start
 - Lift start
 - High frequency start
- d. Torch
 - Collet and body
 - Nozzle type and size
 - Electrode sharpening
 - Tungsten electrode type and size
 - Electrode stick out
- e. Shielding gas
- f. Filler metals
 - Type (alloy)
 - Size
- g. Torch manipulation techniques
 - Walking the cup
 - Forehand and backhand
 - Bead width and shape
- h. Verify setup
 - Test specimen of same base metal, electrode filler metal and position

8. Perform welds using GTAW processes. 25%

- a. Fillet weld
 - Mild steel plate
 - ER49S-2/3 (ER70S-2/3)
 - All positions
- b. Groove weld
 - Mild steel plate
 - ER49S-2/3 (ER70S-2/3)
 - 1G position
- c. Perform post-weld operations
 - Prepare completed welds to specifications
 - Visually inspect finished welds

Welder

Unit: B7 Submerged Arc Welding I

Level: Two

Duration: 14 hours

Theory: 14 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge and skills of submerged arc welding (SAW). Beginning with terminology and safe work practices, the unit covers SAW equipment, components and their characteristics, applications, operation and maintenance. The unit also covers SAW equipment set up and operating parameters. Finally, apprentices will describe the procedures to perform welds using SAW equipment.

Objectives and Content:	Percent of Unit Mark (%)
1. Define terminology associated with submerged arc welding (SAW). a. Refer to welder red seal occupational standard (RSOS)	5%
2. Identify hazards and describe safe work practices of SAW. a. Burns, fumes and hazardous gases b. Falling objects, fire hazards, falling and slip hazards	5%
3. Identify and describe SAW equipment, components and their characteristics, applications, operation and maintenance. a. Power source <ul style="list-style-type: none"> Inverters Rectifiers Transformers b. Equipment <ul style="list-style-type: none"> Drive rolls Contact tips Hoppers Work lead clamps Polarity Welding head and control system Wire straightener Booms Tracks Sub-arc tractors Flux recycling equipment c. Digital technology <ul style="list-style-type: none"> Waveform programming Realtime monitoring 	20%

- Pre-sets
- Frequency

4. **Describe the procedures to set up SAW equipment.** **20%**
 - a. Identify damage and defects in SAW equipment
 - b. Adjust machine settings on power source(s)
 - Set required current type
 - c. Connect cables (leads) to power source(s) and wire feeder
 - d. Assemble equipment and components
 - e. Install and adjust wire
 - Feed wire through liner
 - Wire drive roll tension
 - Barrel and contact tip
 - Clip end of wire for appropriate stick-out
 - f. Attach work lead clamp to base metal
 - g. Fill flux hopper
 - h. Verify setup
 - Tracking consistency and required travel speed

5. **Describe and demonstrate the procedures to set operating parameters for SAW.** **20%**
 - a. Determine Parameters
 - WPS/WPDS and application
 - b. Set/adjust amperage
 - Base metal
 - Electrode
 - c. Set wire feed speed and voltage
 - Base metal type and thickness
 - Size and composition of wire
 - Position of weld
 - d. Set electrode stick-out
 - e. Set flux rate
 - f. Set travel speed
 - g. Verify setup

6. **Describe and demonstrate the procedures to perform welds using SAW equipment.** **30%**
 - a. Start-up equipment
 - b. Adjust head height
 - Maintain stick-out and to control flux coverage
 - c. Verify setup
 - Dry run to ensure tracking consistency
 - d. Initiate arc
 - Wire feed
 - Travel
 - Current
 - e. Monitor and adjust travel speed and angle
 - Consistent tracking
 - f. Recover, filter and demagnetize flux
 - g. Stop arc
 - Tie-ins
 - h. Remove slag
 - i. Weld discontinuities
 - Visually inspect

- Determine cause
 - Repair grinding/gouging and re-welding
- j. Shut down equipment

Welder

Unit: B8 Welder Practical Examination II

Level: Two

Duration: 7 hours

Theory: 0 hours

Practical: 7 hours

Overview:

This unit is designed to verify required weld competency as part of the Manitoba welder practical examination. These required welds will be performed during Level 2 technical training to meet or exceed industry standards and national welding benchmarks. All individual processes below are pass/fail. All objectives must be passed to achieve a unit pass during technical training. Progression to the next level of technical training is a requirement to the successful completion of this unit and the unique welding operations.

Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a "Pass/Fail" grade will be recorded for the unit in its entirety.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
<p>1. Perform groove weld assembly using shielded metal arc welding (SMAW).</p> <ul style="list-style-type: none"> a. Groove weld assembly <ul style="list-style-type: none"> • Mild steel b. Weld position <ul style="list-style-type: none"> • 3G • 3GF • 4GF c. Electrode <ul style="list-style-type: none"> • E-6010 (E-4310) root pass 1/8" diameter electrode (3G) • E-7018 (E-4918) fill and cap passes, choice of 3/32 or 1/8" diameter electrode d. Follow provided drawing and specifications e. Testing procedure <ul style="list-style-type: none"> • Visual examination • Destructive bend test 	n/a
<p>2. Perform groove fillet weld assembly using gas metal arc welding (GMAW).</p> <ul style="list-style-type: none"> a. Base metal <ul style="list-style-type: none"> • Mild steel plate b. Weld position <ul style="list-style-type: none"> • 2G c. Wire <ul style="list-style-type: none"> • ER49S-6 (ER70S-6) • Diameter = 0.035 d. Follow provided drawing and specifications 	n/a

- e. Testing procedure
 - Visual examination
 - Destructive bend test
