

COURSE FAB2040: THERMAL CUTTING**Level:** Intermediate**Theme:** Fabrication Processes**Prerequisite:** FAB1040 Oxyacetylene Welding**Description:** Students develop basic skills to use, safely and efficiently, thermal cutting equipment and supplies.**Parameters:** Access to a fabrication work centre complete with thermal cutting equipment and to instruction from an individual with formal, specialized training in oxyfuel cutting practices.**Curriculum and Assessment Standards**

| General Outcomes | Assessment Criteria and Conditions | Suggested Emphasis |
|---|--|--------------------|
| <p><i>The student will:</i></p> <ul style="list-style-type: none"> • identify health and safety hazards associated with thermal cutting, and take preventive measures to avoid accidents and personal injury to self and others • perform safe start-up and shut-down cutting procedures • demonstrate basic manual cutting operations | <p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> • observed performance related to: <ul style="list-style-type: none"> – lab preparation – lab management – safe tool/material handling and storage | 10 |
| | <ul style="list-style-type: none"> • demonstration of consistent safe start-up and shut-down procedures using oxyfuel, carbon arc and/or plasma arc equipment | 20 |
| | <ul style="list-style-type: none"> • completion of uniform, straight, irregular and bevel cuts and pierced holes. <p><i>Assessment Tool</i> <i>Assessment Framework: Fabrication Process, FABPRS</i></p> <p><i>Standard</i> <i>Edges are to be square and drag lines are essentially vertical and not overly pronounced.</i> <i>There should not be evidence of gouging or excessive amounts of slag or dross</i> <i>Performance rating of 2 for each applicable task</i></p> | 70 |

COURSE FAB2040: THERMAL CUTTING (continued)

| General Outcomes | Assessment Criteria and Conditions | Suggested Emphasis |
|---|--|------------------------------|
| <p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate basic competencies. | <p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the learning process. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p> | <p>Integrated throughout</p> |

| Concept | Specific Outcomes | Notes |
|---|--|---|
| <p>Orientation</p> <ul style="list-style-type: none"> Health and Safety Thermal Cutting Characteristics of Ferrous and Nonferrous Metals Oxyfuel Cutting | <p><i>The student should:</i></p> <ul style="list-style-type: none"> identify the workplace labels and precautionary procedures when using: <ul style="list-style-type: none"> compressed gas flammable materials oxidizing materials electrical equipment review a safety plan in case of accident describe common metals that can be successfully cut using: <ul style="list-style-type: none"> oxyfuel air carbon arc shielded metal arc plasma arc processes describe the oxyfuel process in relation to: <ul style="list-style-type: none"> ignition temperature and identification slag and oxide removal identify the types of cutting fuels, their operating temperatures and efficiency ratios identify the parts of a cutting torch and their function describe the relationship between tip size, metal thickness and gas pressures | <p>Explain why oxyfuel cutting is limited to cutting ferrous materials.</p> |

COURSE FAB2040: THERMAL CUTTING (continued)

| Concept | Specific Outcomes | Notes |
|---|--|---|
| <ul style="list-style-type: none"> • Oxyfuel Cutting (continued) • Plasma Arc Cutting | <p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe the factors controlling tip selection; e.g.: <ul style="list-style-type: none"> – depth of cut – type of material – condition of metal – type and quality of cut • describe the correct way to start a cut and pierce a hole • describe the plasma arc process in relation to: <ul style="list-style-type: none"> – arc formation – cutting gas – cooling – dross formation • identify and describe the purpose of the parts of a plasma arc cutting system • describe the appropriate method to: <ul style="list-style-type: none"> – start an arc – set standoff distance – control the kerf • list the advantages of using a plasma arc cutting system. | <p>Explain why the plasma arc process can be used for cutting both ferrous and nonferrous materials.</p> <p>In addition to plasma arc cutting, demonstrate the use of carbon arc gouging equipment.</p> |
| <p>Planning and Management</p> <ul style="list-style-type: none"> • Tool Selection and Adjustment • Worker Safety | <ul style="list-style-type: none"> • select and adjust the appropriate equipment for a given cutting operation • describe correct start-up and shut-down procedures • locate the recommended fire extinguisher • locate and wear the appropriate personal protective equipment • locate and clear the workstation of all combustible materials. | |

COURSE FAB2040: THERMAL CUTTING (continued)

| Concept | Specific Outcomes | Notes |
|---|---|--|
| <p>Implementation</p> <ul style="list-style-type: none"> • Oxyfuel • Plasma Arc • Carbon Arc Gouging | <p><i>The student should:</i></p> <ul style="list-style-type: none"> • demonstrate the use of oxyfuel equipment to cut: <ul style="list-style-type: none"> – straight edges and bevels – curves – holes in mild steel plate • demonstrate the use of plasma arc to cut: <ul style="list-style-type: none"> – straight and curved cuts – holes in ferrous and non-ferrous metals • demonstrate the safe use of carbon arc gouging equipment. | <p>Besides preparing materials for fabrication, metal cutting equipment is often used to create metal sculpture.</p> |
| <p>Assessment</p> <ul style="list-style-type: none"> • Quality Control • Career Preparation | <ul style="list-style-type: none"> • inspect a cut and determine ways to improve the quality of the cut related to the size of the preheating flame, oxygen pressure, cutting speed and different machine settings, gas pressures and cutting speeds for plasma arc cutting • prepare a record of completed activities within a portfolio. | |