

**-SQA-SCOTTISH QUALIFICATIONS AUTHORITY**

**Hanover House  
24 Douglas Street  
GLASGOW G2 7NQ**

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**NATIONAL CERTIFICATE MODULE DESCRIPTOR**

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**-Module Number- 0095095 -Session-1989-90**  
**-Superclass- XE**

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**-Title- PLUMBING: LEADBURNING, BRONZE WELDING AND HARD SOLDERING**

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**-DESCRIPTION-**

**Purpose** This module is designed to develop the knowledge and skills required to use gas welding and heating equipment and to joint metal sheet and pipe by thermal processes. It is intended to form part of a course of study which should include complementary industrial experience and it is aimed at those following a career in plumbing.

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**Preferred Entry Level** No formal entry requirements

**Learning Outcomes** The student should:

1. assemble and test oxy-acetylene welding and propane heating equipment to joint metals;
2. joint lead sheets at butt edge by leadburning;
3. joint copper tubes by bronze welding and hard soldering.

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**Content/ Context** Safety regulations and safe working practices and procedures should be observed at all times.

Corresponding to Learning Outcomes 1-3:

1. Safety precautions incorporated in oxy-acetylene and propane heating equipment: colour coding of cylinders and hoses, types of threads used in regulators, hoses and torches, blow back prevention devices, cylinder shapes, sizes.

Precautions to be observed in assembling of equipment: emergency procedures, leak detection in oxy-acetylene and propane equipment.

Flame types: neutral, oxidising and carbonising types of torches and nozzles.

Safe use of equipment. Protective equipment to be worn.

2. Joint preparation; loading: penetration in lead burned joints, weld pattern, operating pressures; joint support.

3. Types of hard solder; application of hard solder; fluxes; constituents of hard solder; joint preparation; support and alignment of joints.

Suggested Learning and Teaching Approaches

This module is essentially a practical module and it is anticipated that it will be centred in a workshop situation.

Demonstrations should be given by the lecturer at each stage of the module i.e. assembly and testing of oxy-acetylene and propane equipment and the methods of preparing and manufacturing joints.

The student should be given adequate opportunity to practice all the joints specified prior to attempting the assessments stipulated.

Assessment Procedures

Acceptable performance in the module will be satisfactory achievement of all the performance criteria specified for each Learning Outcome.

The following abbreviations are used below:

LO Learning Outcome

IA Instrument of Assessment

PC Performance Criteria

LO1

ASSEMBLE AND TEST OXY-ACETYLENE WELDING AND PROPANE HEATING EQUIPMENT TO JOINT METALS

PC The student:

- (a) assembles equipment properly;
- (b) tests equipment to ensure absence of leaks;
- (c) selects nozzle size appropriate to the task;
- (d) adjusts operating pressures appropriate to the task;
- (e) adjusts gas to obtain flame type appropriate to the task;
- (f) follows safe working practices relevant to the task.

## IA Practical Exercise

The student will be presented with an exercise consisting of a series of practical tasks to test the application of knowledge and skills required to assemble and test oxy-acetylene welding and propane heating equipment.

The exercise will consist of 3 tasks allocated as follows:

(1) leadburning joints (2) bronze welding joints (3) hard soldered joints

For tasks 1 and 2 the student will be presented with the cylinders and all associated equipment required to form a typical oxy-acetylene plant.

For each task the student will be required to:

- (i) assemble and test the plant
- (ii) select appropriate nozzle
- (iii) set operating pressures
- (iv) light and adjust an appropriate flame type

For task 3 the student will be presented with the cylinder and all associated equipment required to form a typical propane plant.

For the task the student will be required to:

- (i) assemble and test the plant
- (ii) select appropriate nozzle
- (iii) light and adjust an appropriate flame type

Satisfactory achievement of the Learning Outcome will be demonstrated by the student meeting all the performance criteria for each task.

LO2

JOINT LEAD SHEETS AT BUTT EDGE BY LEADBURNING

PC The student:

- (a) prepares lead sheets to be jointed;
- (b) selects equipment appropriate to the task;
- (c) assembles and test equipment to ensure absence of leaks;
- (d) joints lead sheets at butt edge to specified tolerances;
- (e) follows safe working practices relevant to the task.

IA Practical Exercise

The student will be presented with a practical exercise to test the application of knowledge and skills required to joint lead sheets at butt edge by leadburning.

The student will be required to prepare and leadburn a 300mm horizontal butt joint on BS Code No.5 lead sheet.

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by the student gaining all items from the following checklist:

#### CHECKLIST

1. joint width is between 10mm to 12mm
2. joint loading is adequate for thickness of material used
3. joint is proud of material used
4. weld has penetrated the parent metal
5. a consistent weld pattern is produced
6. safe working practices have been followed

LO3

#### JOINT COPPER TUBES BY BRONZE WELDING AND HARD SOLDERING

PC The student:

- (a) prepares copper tubes to be jointed;
- (b) selects equipment appropriate to the task;
- (c) selects correct jointing rod appropriate to the task;
- (d) assembles and tests equipment to ensure absence of leaks;
- (e) joints copper tubes to specified tolerances with sufficient loading and properly aligned pipes;
- (f) follows safe working practices relevant to the task.

IA Practical Exercise

The student will be presented with an exercise consisting of two practical tasks to test the application of knowledge and skills required to joint copper tubes by bronze welding and hard soldering.

The student will be required to produce:

- (i) one bronze welded bell (cup) joint on 32mm diameter copper tube
- (ii) one hard soldered capillary joint on 22mm diameter copper tube.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student meeting all performance criteria for each task.

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