-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- **2210470** **-Session-1990-91**
-Superclass- **XE**

-Title- **INTRODUCTION TO METAL INERT GAS (MIG) WELDING ($x^1/_2$)**

-DESCRIPTION-

Purpose

This module is designed to enable students to acquire and develop the basic skills and knowledge required to connect and set up MIG welding equipment. Also to provide the basic skills of welding light gauge material, for example as used in vehicle exhaust systems.

It is aimed at those intending to pursue a career in the motor vehicle repair industry. The module is also designed to provide the student with the necessary knowledge and skills to satisfy the MIG welding requirement for the RTITB Skills Test for module LV105C EXHAUST SYSTEM: Fitting and Fault Finding and HV181C Engine Exhaust System: Remove, Replace, Adjust and Fault Diagnosis. It should be noted however that adequate supporting industrial experience will also be necessary.

Preferred Entry Level

Modules numbered 94370 through 94377 inclusive. and 2210450.

Learning Outcomes

The student should:

1. demonstrate the procedures to set up and adjust MIG welding equipment;
2. prepare metals for joining;
3. weld metals using MIG welding process;
4. recognise common welding faults.

Assessment

Acceptable performance in the module will be

Procedures

satisfactory achievement of all the performance criteria specified for each Outcome.

The following abbreviations are used below:-

PC Performance Criteria
IA Instrument of Assessment

Note: The Outcomes and PCs are mandatory and cannot be altered. The IA may be altered by arrangement with SQA. (Where a range of performance is indicated, this should be regarded as an extension of the PCs and is therefore mandatory).

OUTCOME 1 DEMONSTRATE THE PROCEDURES TO SET UP AND ADJUST MIG WELDING EQUIPMENT

PCs

The student:

(a) identifies equipment components;
(b) states the purpose of each item of welding equipment;
(c) identifies operating faults on MIG types of welding equipment;
(d) identifies procedures to avoid personal injury and vehicle damage.
(e) sets up MIG type of equipment for welding light gauge mild steel.

IA Assignment

The student will be presented with an assignment in a workshop environment to test the recall of knowledge and the application of skills relating to the setting up and testing operation of MIG welding equipment.
The assignment will consist of two parts:

(i) a series of restricted response questions related to performance criteria (a), (b), (c) and (d).

(ii) a practical exercise related to performance criteria (e).

The assignment will include:

- colour coding
- threads
- gauge types
- assembly of components
- checking equipment for leaks
- gas pressure setting
- gas flow meter setting
- speed settings

- return clamp

Satisfactory achievement of the Outcome will be based on all performance criteria being met. A suitable checklist may be used to record student performance.

OUTCOME 2 PREPARE METALS FOR JOINING

PCs The student:

(a) identifies the condition of light gauge mild steel for carrying out welding repair procedures;
(b) prepares flat materials for welding butt and lap type joints;
(c) prepares tubular materials for welding butt and lap type joints;
(d) follows safe working practices relevant to the task.

IA Practical Exercises

The student will be presented with a series of practical exercises in a workshop environment to test the recall of knowledge and the application of skills relating to the preparation of flat and tubular material for welding.

The test will take the form of a practical exercise which involves the preparation of light gauge mild steel plate for lap and butt welding.

The test will consist of cleaning flat and tubular material and ensuring that all surfaces are free of oil, paint films and corrosion.

Satisfactory achievement of the Outcomes will be based on all performance criteria being met. This will be demonstrated by the student producing material correctly prepared for welding.

OUTCOME 3 WELD METALS USING MIG WELDING PROCESS

PCs The student:

(a) welds butt type joints using MIG equipment;
(b) welds lap type joints using MIG equipment;
(c) follows safe working practices relevant to the task.

IA Practical Exercise

The student will be presented with a series of practical exercises to test the recall of knowledge and the application of skills relating to welding flat and tubular material using MIG processes.

The test will consist of a series of exercises which includes items from the following list:

(i) butt weld flat mild steel plate (18-20swg)
(ii) lap weld flat mild steel plate (18-20swg)
(iii) butt weld mild steel tube (18-20swg)
(iv) lap weld mild steel tube (18-20swg)

Satisfactory achievement of the Outcome will be based on all performance criteria being met. This will be demonstrated by the student producing satisfactory joints for each of the 4 listed items.

OUTCOME 4 RECOGNISE COMMON WELDING FAULTS

PC The student:

(a) identifies faults on MIG welded joints by visual inspection;
(b) specifies corrective action for welding faults which have been identified;

IA Practical Exercise

The student will be presented with a practical exercise to test the application of knowledge and skills relating to the visual inspection, recognition of common faults and corrective action for MIG welding. The welded joints to be inspected should include examples of the following:

(i) incorrect weld appearance
(ii) spatter
(iii) lack of fusion
(iv) lack of penetration
(v) porosity
(vi) undercutting
(vii) dirt/rust inclusion
(viii) cracking

Satisfactory achievement of the Outcome will be based on all performance criteria being met. This will be demonstrated by the student identifying 5 welding faults, from the given examples, and stating the appropriate corrective action. A suitable checklist may be used to record student performance.

The following sections of the descriptor are offered as guidance.
They are not mandatory.

CONTENT/CONTEXT

Safety regulations, safe working practices and procedures should be observed at all times.

Particular dangers associated with oil or grease near gas cylinders, hoses and threaded unions, must be stressed.

Corresponding to Outcomes 1-4:

This module should be taught in the context most suited to the students' particular needs. This module is intended to give students an understanding of welding skills as a means of promoting vehicle safety, prolonging operational life and maintaining to original specification.

SUGGESTED LEARNING AND TEACHING APPROACHES

This module should be undertaken in a service workshop with an adequate range of light gauge flat and tubular material, such as that used in vehicle exhaust systems. Students must be taught the correct procedures for connecting gas cylinders, setting up and testing MIG welding equipment of the type likely to be found in motor vehicle repair workshops.

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