

**-SQA- SCOTTISH QUALIFICATIONS AUTHORITY**

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

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**NATIONAL CERTIFICATE MODULE DESCRIPTOR**

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<b>-Module Number-</b>	<b>2210961</b>	<b>-Session-1991-92</b>
<b>-Superclass-</b>	<b>XS</b>	

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<b>-Title-</b>	<b>WELDING HIGH STRENGTH STEELS IN MOTOR VEHICLE BODY REPAIRWORK</b>
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**-DESCRIPTION-**

**Purpose** This module is designed to provide the skills and knowledge employed in the repair of accident damaged motor vehicles using high strength alloy steel components in their construction.

It is part of a series of body repair modules which can be taken separately or may be joined to give an integrated programme covering the range of skills required by a light or heavy body repairer.

The standards contained in the module cover the work and Transkill Assessments for RTITB Skills Test BR081 Welding of High Strength Steels.

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<b>Preferred Entry Level</b>	2210470 Introduction to Metal Inert Gas (MIG) Welding (X 1/2) 2210550 Introduction to Oxy-Acetylene Welding (X 1/2) 2210951 Introduction to Resistance (Spot) Welding (X 1/2) 74442 Vehicle Configurations, Constructions and Identification (X 1/2)
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<b>Outcomes</b>	The student should:  1. identify the high strength steels used in motor vehicle bodies;  2. weld high strength steels using metal inert gas (MIG) welding equipment;  3. weld high strength steels using resistance (spot) welding equipment.
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Assessment Procedures      Acceptable performance in this module will be 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                    IDENTIFY THE HIGH STRENGTH STEELS USED IN MOTOR VEHICLE BODIES**

- PCs                    (a)    The identification of parts of vehicle bodies which may be manufactured from high strength steels or galvanised steel is correct in terms of name and location.
- (b)    The identification by use of appropriate literature of the type of high strength steel used for a component is correct in terms of name and recommended procedures for cutting and welding.

IA    Structured Question

The student will be presented with an exercise consisting of a structured question to test knowledge related to the location and identification of vehicle body components which may require special consideration when being cut or welded.

The question should be based on a vehicle and subdivided into 4 parts requiring the student to identify the vehicle and components in order to use the technical information published by vehicle manufacturers, Thatcham and other vehicle data publishers, detailing the recommended procedures, materials and equipment for cutting or welding.

Information to be used in the question should include:

inert gases and weld wire for MIG welding;  
equipment settings for MIG welding;  
procedures for resistance (spot) welding;  
ventilation requirements when welding;  
methods of sealing and preventing corrosion of welded joints.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student producing a correct response to each part of the structured question.

**OUTCOME 2                    WELD HIGH STRENGTH STEELS USING (MIG) WELDING EQUIPMENT**

- PCs
- (a) The selection of MIG welding gas and welding wire is correct for a given application.
  - (b) The preparation of the welding equipment in accordance with the manufacturers' instructions for a given application.
  - (c) The preparation of the materials to be welded produces surfaces correct for the application of the weld.
  - (d) The welding of the materials produces a weld which is secure and free from visual defects.
  - (e) Use of tools is appropriate to the task.
  - (f) Working practices followed are in accordance with current safety regulations.
  - (g) The visual identification of common faults in the welding of high strength steels is correct in terms of the name and cause of each fault.
  - (h) The corrective action specified for each fault would prevent that fault recurring.

**IA    Assignment**

The student will be presented with an assignment set in a workshop environment to test the application of knowledge and skills required in the selection, setting up and use of MIG welding equipment to weld stated vehicle body components.

The assignments will consist of 2 parts as follows:

Part (1): A practical exercise related to PC (a) to (f) to include MIG welding 1 overlap and 1 butt joint of:

- (i) similar types of high strength steels;
- (ii) high strength steel to low carbon steel;
- (iii) different gauges of high strength steels;
- (iv) different gauges of high strength steel to low carbon steel.

Part (2): An identification exercise related to PC (g) to (h) for which the student should visually identify and state the possible cause including the corrective action for all of the following:

- (i) porosity;
- (ii) dirt/rust inclusion;
- (iii) lack of fusion;
- (iv) lack of penetration;
- (v) brittleness;
- (vi) poor finish;
- (vii) excessive build-up.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student for:

Part (1): producing 8 satisfactory welds;

Part (2): from the examples (i) to (vii) given:

- (a) identifying 5 faults;
- (b) stating one possible cause of each identified fault;
- (c) stating the corrective action required to prevent each of the named faults recurring.

### **OUTCOME 3      WELD HIGH STRENGTH STEELS USING RESISTANCE (SPOT) WELDING**

PCs

- (a) The preparation of the welding equipment in accordance with the manufacturers' instructions for a given application.
- (b) The preparation of the materials to be welded produces surfaces ready for the application of the weld.
- (c) The welding of the materials produces a weld which is secure and free from visual defects.
- (d) Use of tools is appropriate to the task.
- (e) Working practices followed are in accordance with current safety regulations.
- (f) The visual identification of common faults in the welding of high strength steels is correct in terms of the name and cause of each fault.
- (g) The corrective action specified for each fault would prevent that fault recurring.

## IA Assignment

The student will be presented with an assignment set in a workshop environment to test the application of knowledge and skills required in the selection, setting up and use of resistance (spot) welding equipment to weld stated vehicle body components.

The assignment will consist of 2 parts as follows:

Part (1): A practical exercise related to PC (a) to (e) to include resistance spot welding 1 overlap seam of:

- (i) similar types of high strength steels;
- (ii) high strength steel to low carbon steel;
- (iii) different gauges of similar high strength steels;
- (iv) different gauges of high strength steel to low carbon steel.

Part (2): An identification exercise related to PC (f) to (g) for which the student should visually identify and state the possible cause including the corrective action for all of the following:

- (i) excessive pitting;
- (ii) incorrect heat balance;
- (iii) weld metal expulsion;
- (iv) weld pressure marks;
- (v) heat build-up and discolouration;
- (vi) undersize welds;
- (vii) indentation.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student for:

Part (1) producing 4 satisfactory overlap welds 250mm in length.

Part (2) from the examples (i) to (vii) given:

- (a) identifying 5 faults;
- (b) stating one possible cause of each identified fault;
- (c) stating the corrective action required to prevent each of the named faults recurring.

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

CONTENT/CONTEXT

Safety regulations and safe working practices must be emphasised and included in the instruction at all times.

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SUGGESTED LEARNING AND TEACHING APPROACHES

Particular emphasis should be given to the special hazards associated with the cutting and welding of alloy steels and galvanised components.

One of the tasks used in Outcome 1 could be used to form the basis of the work to be carried out in Outcome 2.

The requirements of any Industry Body such as the RTITB Transkill scheme should be investigated for inclusion and assessment in the module.

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