

**-SQA- SCOTTISH QUALIFICATIONS AUTHORITY  
NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION**

**GENERAL INFORMATION**

**-Module Number-**        **2250404**                                            **-Session-1994-95**  
**-Superclass-**            **XA**  
**-Title-**                    **BASIC ENGINEERING MATERIALS (x<sup>1</sup>/<sub>2</sub>)**

-----

**-DESCRIPTION-**

**GENERAL COMPETENCE FOR UNIT:** Identifying and classifying basic materials for engineering applications.

**OUTCOMES**

1. identify common materials by using simple workshop tests;
2. identify properties and defects of materials;
3. select materials for a given component specification.

**CREDIT VALUE:** 0.5 NC Credit

**ACCESS STATEMENT:** No formal entry qualifications.

-----

For further information contact: Committee and Administration Unit, SQA, Hanover House, 24 Douglas Street, Glasgow G2 7NQ.

Additional copies of this unit may be purchased from SQA (Sales and Despatch section). At the time of publication, the cost is £1.50 (minimum order £5).

**NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION****STATEMENT OF STANDARDS****UNIT NUMBER:** 2250404**UNIT TITLE:** BASIC ENGINEERING MATERIALS

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

**OUTCOME**

1. IDENTIFY COMMON MATERIALS BY USING SIMPLE WORKSHOP TESTS

**PERFORMANCE CRITERIA**

- (a) A selection of materials in the range statement is correctly identified.
- (b) The forms in which each of the materials are commonly available are correctly listed.
- (c) Materials are correctly identified by colour codes and British standards and Euro-Norm specifications.

**RANGE STATEMENT**

Materials: mild steel; aluminium; brass; copper; stainless steel; cast iron; plastics thermo setting; thermoplastic.

Forms of supply: bar stock; hot and cold rolled section; castings; plate; sheet; mouldings; extrusions.

**EVIDENCE REQUIREMENTS**

Written or oral evidence of candidate's ability to identify all the materials in the range statement.

Written or oral evidence of candidate's ability to identify all forms of supply in the range statement.

Written or oral evidence of candidate's ability to identify two materials by codes specification.

**OUTCOME****2. IDENTIFY PROPERTIES AND DEFECTS OF MATERIALS****PERFORMANCE CRITERIA**

- (a) A selection of properties is correctly identified by using workshop tests.
- (b) A selection of defects is correctly identified by using workshop tests.
- (c) Effects of production methods on properties are correctly identified.

**RANGE STATEMENT**

Properties: magnetic; corrosion resistance; ductility; malleability hardness; strength; toughness; electrical conductivity; thermal conductivity.

Methods: extrusion; hot and cold working.

**EVIDENCE REQUIREMENTS**

Recorded evidence of candidate's ability to identify properties in one metallic and one non-metallic material.

Recorded evidence of candidate's ability to identify two of the following - cracks, distortion, porosity and corrosion defects.

Recorded evidence of candidate's ability to establish change in properties caused to one material due to production methods within the range statement.

**OUTCOME****3. SELECT MATERIALS FOR A GIVEN COMPONENT SPECIFICATION****PERFORMANCE CRITERIA**

- (a) Each of the materials properties is correctly identified from the component specification.
- (b) The correct materials are selected to satisfy identified properties.

**RANGE STATEMENT**

Properties: magnetic; corrosion resistance; ductility; malleability hardness; strength; toughness; electrical conductivity; thermal conductivity.

Materials: mild steel; aluminium; brass; copper; stainless steel; cast iron; plastics thermo setting; thermoplastic.

**EVIDENCE REQUIREMENTS**

Written or oral evidence of candidate's ability to extract two required properties from the component specification.

Written or oral evidence of candidate's ability to match material selection to required properties.

-----

**ASSESSMENT**

In order to achieve this unit, candidates are required to present sufficient evidence that they have met all the performance criteria for each outcome within the range specified. Details of these requirements are given for each outcome. The assessment instruments used should follow the general guidance offered by the SQA assessment model and an integrative approach to assessment is encouraged. (See references at the end of support notes).

Accurate records should be made of the assessment instruments used showing how evidence is generated for each outcome and giving marking schemes and/or checklists, etc. Records of candidates' achievements should be kept. These records will be available for external verification.

**SPECIAL NEEDS**

In certain cases, modified outcomes and range statements can be proposed for certification. See references at end of support notes.

© Copyright SQA 1994

Please note that this publication may be reproduced in whole or in part for educational purposes provided that:

- (i) no profit is derived from the reproduction;
- (ii) if reproduced in part, the source is acknowledged.

**NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION****SUPPORT NOTES**

**UNIT NUMBER:** 2250404

**UNIT TITLE:** BASIC ENGINEERING MATERIALS

**SUPPORT NOTES:** This part of the unit specification is offered as guidance. None of the sections of the support notes is mandatory.

**NOTIONAL DESIGN LENGTH:** SQA allocates a notional design length to a unit on the basis of time estimated for achievement of the stated standards by a candidate whose starting point is as described in the access statement. The notional design length for this unit is 20 hours. The use of notional design length for programme design and timetabling is advisory only.

**PURPOSE** SQA publishes summaries of NC units for easy reference, publicity purposes, centre handbooks, etc. The summary statement for this unit is as follows:

On completion of this module you will be able to identify and cross-reference material properties and select suitable materials for the manufacture of components.

This module may be studied in conjunction with an appropriate engineering drawing module so that the detailing of a component can be comprehensively achieved.

**CONTENT/CONTEXT** The level of competence achieved by the candidate would result in an integrated knowledge of material selection linked to requirements of the component net by the properties of the selected materials possibly modified by subsequent manufacturing processes.

Corresponding to outcomes:

1. Ability to identify materials by their behaviour during simple workshop test and visual inspection. Common forms of material supply should be established by reference to B.S. and Euro-Norm publications and material manufacturers information sheets.
2. Visual inspection and workshop tests should be used to qualitatively confirm the material properties established in Outcome 1 and material defects determined mainly by visual techniques.
3. A simple database should be developed from the results of investigations completed in Outcomes 1 and 2 and this could be used as a means of matching material properties with component requirements.

**APPROACHES TO GENERATING EVIDENCE** This module should be delivered in a workshop environment and a comprehensive range of components made from different materials available for familiarisation purposes. The use of structured worksheets in all outcomes would allow efficient use of facilities. Set exercises could be used in all outcomes as assessment instruments.

**ASSESSMENT PROCEDURES** Centres may use instruments of assessment which are considered appropriate but some suggestions are shown below.

Outcome 1 The results of a range of tests for strength, hardness, density, colour, corrosion resistance, magnetic reaction, ductile behaviour, toughness and electrical and thermal conductivity could be listed against numbered specimens of materials which were also available and the materials identified using this basis.

The forms of supply for each material could be added to this sheet by the candidate and two of the materials could be bar samples with colour codes on their end; these codes could then be identified and recorded by the candidates.

Outcome 2 Candidate is presented with property information in one common metal and one non-metal material and asked to indicate material behaviour against the list of properties in a prepared sheet.

Two material samples with defects would be correctly inspected and the defects recorded on a prepared sheet.

One component to be examined which has had a property changed due to a manufacturing process and the change correctly observed and recorded.

Outcome 3 Candidate is presented with a drawing, the functional requirements and the working environment of a component. Asked to make a short list of three materials which could be used and to select a final choice giving reasons.

**PROGRESSION** This module may form part of a National Certificate programme for National Awards in Engineering Practice and for the required programme for SVQ in Engineering Manufacture: Foundation level II.

**RECOGNITION** Many SQA NC units are recognised for entry/recruitment purposes. For up-to-date information see the SQA guide 'Recognised and Recommended Groupings'.

## REFERENCES

1. Guide to unit writing.
2. For a fuller discussion on assessment issues, please refer to SQA's Guide to Assessment.
3. Procedures for special needs statements are set out in SQA's guide 'Students with Special Needs'.
4. Information for centres on SQA's operating procedures is contained in SQA's Guide to Procedures.
5. For details of other SQA publications, please consult SQA's publications list.

© Copyright SQA 1994

Please note that this publication may be reproduced in whole or in part for educational purposes provided that:

- (i) no profit is derived from the reproduction;
- (ii) if reproduced in part, the source is acknowledged.