-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION

GENERAL INFORMATION

-Module Number- **2270484** **-Session-1994-95**

-Superclass- **XD**

-Title- **INTRODUCTORY FABRICATION SKILLS**

-DESCRIPTION-

GENERAL COMPETENCE FOR UNIT: Acquiring basic skills in the use of fabrication tools, equipment and related processes.

OUTCOMES

1. interpret simple drawings and instructions for fabricated components and assemblies;

2. demonstrate the use of measuring and marking out equipment, and relative procedures;

3. identify and use the tools and equipment required to manufacture a component;

4. test to ensure a quality assembly.

CREDIT VALUE: 1 NC Credit

ACCESS STATEMENT: Access is at the discretion of the centre. However it would be beneficial if the candidate had some prior experience in workshop operations and in the understanding of simple drawings and instructions. No units are necessary for entry to this unit.

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).

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STATEMENT OF STANDARDS

UNIT NUMBER: 2270484

UNIT TITLE: INTRODUCTORY FABRICATION SKILLS

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. INTERPRET SIMPLE DRAWINGS AND INSTRUCTIONS FOR FABRICATED COMPONENTS AND ASSEMBLIES

PERFORMANCE CRITERIA

(a) Analysis of the specifications is correct.
(b) Identification of the functional dimensions and the necessity for tolerances is correct.
(c) Explanation of the advantages of having a sequence of operations drawn up prior to manufacture is logical.

RANGE STATEMENT

The range is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Oral evidence, with suitable checklists, is sufficient for all three criteria. In doubtful cases, "dummy" drawings and planning sheets with alternative checklists could be used.

OUTCOME

2. DEMONSTRATE THE USE OF MEASURING AND MARKING OUT EQUIPMENT, AND RELATIVE PROCEDURES

PERFORMANCE CRITERIA

(a) Construction of datums is correct.
(b) Marking out of the appropriate template using the given allowances for metal thickness is correct.
(c) Identification is made that all functional dimensions are within the permitted tolerances of ± 1.5mm.
(d) Addition of extra information for the layout is correct in terms of the treatments given.

RANGE STATEMENT

Treatments: fastening and joining; edge; notching.

EVIDENCE REQUIREMENTS

Observation checklists are required for all four criteria, each performance criterion being checked before the candidate proceeds to the next criterion. For certain tasks or exercises Performance Criterion (d) may be redundant, but at least one task or exercise must be carried out involving Performance Criterion (d).

OUTCOME

3. IDENTIFY AND USE THE TOOLS AND EQUIPMENT REQUIRED TO MANUFACTURE A COMPONENT

PERFORMANCE CRITERIA

(a) Selection and use of tools and equipment to cut material are correct.
(b) Selection and use of tools and equipment to bend and form material are correct.
(c) Selection and use of tools and equipment to fasten and join material are correct.
(d) Selection and use of tools and equipment to hand forge material are correct.

RANGE STATEMENT

Cutting: straight edges; curved edges; inside curves; outside curves; punch holes; drill holes; sectional shape.

Cutting tools: guillotine; bench shears; snips.

Safety: tool maintenance; "burr" and "rag" removal.

EVIDENCE REQUIREMENTS

Written evidence of observation checklists is required for all four performance criteria.

Performance evidence is required of the candidate's ability to use tools and equipment to given specifications.

OUTCOME

4. TEST TO ENSURE A QUALITY ASSEMBLY

PERFORMANCE CRITERIA

(a) Inspection and listing of all dimensions outwith given tolerances are correct in terms of the type of fabrication.
(b) Awareness of discrepancies between the estimated and actual times is correct in terms of cost implications.
(c) Inspection of joint and identification of faults and remedial action are correct in terms of the type of fabrication.

RANGE STATEMENT

The range is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Each candidate must draw up a checklist which may be itemised under sub-headings, on the artefact(s) he or she has produced.

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.

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SUPPORT NOTES

UNIT NUMBER: 2270484

UNIT TITLE: INTRODUCTORY FABRICATION SKILLS

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 40 hours. The use of notional design length for programme design and timetabling is advisory only.

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

On completion of this unit you will have an appreciation of the skills involved in fabrication and you will have acquired a basic level of these skills. You will be able to understand simple drawings and manufacturing instructions, mark out the templates required, cut, form and join, manufacture, and assess the quality of a simple component or artefact.

CONTENT/CONTEXT The candidate should achieve the level of competence of someone who is required to manufacture a simple component or can assemble a simple sub-assembly. He or she should be able to use tools and equipment safely and correctly and know when a tool requires maintenance and/or sharpening. With practice the sharpening of simple tools should present little difficulty.

Corresponding to Outcomes 1-4:

1. Plenty of hands-on examination of drawings, including recognition of functional dimensions and tolerancing, backed up by videos, wall charts and models could be used for this outcome. Operation sheets could be developed from models beginning with very simple examples. A model which is deliberately assembled in the wrong sequence and needs dismantling to get it right, could be an object lesson.

2. The basic first step, that of establishing datums as references, should be "drummed in" throughout this outcome. Hands-on templating with constant checking, ie the diagonals of a rectangle to ensure it is square, and reference back to datums should permeate all activity. Simple shapes of templates enable emphasis to be put on use of datums as reference planes. Relatively simple layouts should be used to prevent candidates becoming enmeshed in pattern development at the expense of basic marking- out procedures. Resharpening of marking- out equipment such as scribers, centre-punches, should be demonstrated by the tutor/trainer. Templating could, at the discretion of the tutor/trainer, be carried out on template paper then transferred onto metal, or on metal alone.

3. This outcome is the core of the module, although dependent upon Outcomes 1 and 2 being correct, and is entirely hands-on. In the initial stages, each tool, operation or process should be fully explained and demonstrated. Terminology and procedures should be introduced in the context of the exercises. Safety and safe working practices should encompass all activities. Practice and patience, within the allotted time, is the key to this outcome. At least three exercises including one hand forging, must be carried out in addition to the main artefact of the module. Any two of these exercises may, if desired, be incorporated into a project artefact. The main artefact should be suitable for the candidate's background and, prior to commencement, should have a stated time, tolerances and workmanship standards should be made known to the candidate.

4. For candidates to comment critically on their own work is a salutary process. Hopefully they will realise the interdependence of quality with skill and time and that the experience will make them become self-critical of any future work that they may do. Tutors/trainers should emphasise to candidates that quality checks begin with themselves, not an inspector, and is the first step towards a pride in craftsmanship. Tutor/trainers should assist individual candidates in this outcome in a serious but light-hearted manner. The preparation of checklists could be a group activity with each candidate applying the criteria to his or her own artefact(s).

APPROACHES TO GENERATING EVIDENCE The delivery of the unit should predominantly be in a workshop. A set of completed exercises/projects should be available for candidates to see, to work to, and to compare standards. Equipment posters, information charts and tables should be on display to assist the candidates with tool and process selection. Various programmes of exercises/projects should be on display and the programme(s) chosen should relate to the vocational bias of the candidate.

Hands-on candidate activities can, and should, be used throughout all four outcomes.

ASSESSMENT PROCEDURES Centres may use the Instruments of Assessment which are considered by tutors/trainers to be the most appropriate. The assessment of this unit could also be approached in an integrated way with worksheets/drawings covering Outcomes 1-4 developed as a complete project, rather than as four separate outcomes. Examples of Instruments of Assessment which could be used are as follows:

Outcome 1 A minimum of six questions should be on the checklist for Performance Criteria (a), (b) and (c) with at least one question for each Performance Criterion.

Outcome 2 An observation checklist with four sections (a), (b), (c) and (d) should be used for this outcome. Candidates should have each performance criterion checked before proceeding to work on the next performance criterion.

Outcome 3 Four separate and distinct checklists should be used in this outcome, each checklist having the full list of all tools and equipment used in the manufacture of the exercises and/or project artefact and what they have been used for, ie universal snips used to cut an inside curve in 1mm thick aluminium. Candidates should use as wide a spread of tools and equipment, consistent with their competence, as possible. Sharpening of tools, where it occurs, should be listed at the bottom of the checklist but is not a compulsory part of the checklist.

Outcome 4 A completed checklist by each candidate together with his or her completed artefact and exercise(s) should be submitted. Honesty and accuracy, not spelling and syntax, is required from this checklist.

The tutor/trainer has the discretion to assist the candidate with the English and style of his or her checklist(s) or to leave it up to the candidate to complete. Itemised sub-headings will help.

Satisfactory achievement of the unit is based on all the performance criteria in all the outcomes being met.

RECOGNITION Many SQA 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.