

NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION**STATEMENT OF STANDARDS****UNIT NUMBER:** 2131383**UNIT TITLE:** PRESS TOOLING: INTRODUCTION

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. OUTLINE PRESS TOOL OPERATIONS****PERFORMANCE CRITERIA**

- (a) Explanation of the function of punches and dies is correct with respect to accuracy and high volume production.
- (b) Distinction between types of press is accurate.
- (c) Distinction between given punch and die operations is correct.
- (d) Explanation of follow on tools and combination tools is correct.
- (e) Explanation of press tools incorporating cushions is correct.

RANGE STATEMENT

Examples: manufactured components.

Machinery: hand; foot; single and double acting power presses.

Operations: blanking; piercing; notching; coining; embossing; forming; bending.

EVIDENCE REQUIREMENTS

Oral or written evidence that the candidate understands the underlying factors controlling the use of press tools in the production of a range of components.

Oral or written evidence of the candidate's ability to explain the difference between two types of power presses from those listed in the range.

Oral or written evidence of the candidate's ability to explain the function of four operations of press tools from those listed in the range.

Oral or written evidence of the candidate's ability to identify the function of follow on, combination tools and the reason for incorporating cushions in some press tools.

OUTCOME

2. SPECIFY MATERIALS AND PROCESSES USED IN PRODUCTION OF PRESS TOOLS

PERFORMANCE CRITERIA

- (a) Explanation of the influence of component shape and quantity in terms of material selection for the manufacture of press tools is correct.
- (b) Explanation of heat treatment with respect to press tool manufacture is correct.
- (c) Identification of machining processes used in the manufacture of press tools is correct.
- (d) The use of standard die sets is in accordance with manufacturers' recommendations.
- (e) The selection of standard parts appropriate to a selected punch and die is correct.

RANGE STATEMENT

Data: material specifications; standard parts catalogue.

Heat treatment: hardening; normalising; annealing; case hardening.

Machining: spark erosion; CNC machining.

EVIDENCE REQUIREMENTS

Oral or written evidence that the candidate understands the range of basic materials used in the manufacture of press tools.

Oral or written evidence that the candidate can assemble a simple press tool using a range of standard parts.

Oral or written evidence that the candidate understands the range of basic heat treatment processes and their application in the manufacture of press tools.

Oral or written evidence that the candidate understands the range of machining processes and their application in the manufacture of press tools.

OUTCOME

3. OUTLINE PRINCIPLES OF LUBRICATION AND CRACK DETECTION PROCEDURES IN RELATION TO PRESS TOOLS

PERFORMANCE CRITERIA

- (a) Description of the basic principles of lubrication in press tools is correct in relation to friction and pressure.

- (b) Explanation of the causes and the effects cracks can have on press tools is correct.
- (c) Description of methods of crack detection is correct.

RANGE STATEMENT

Lubrication: wear reduction; ejection difficulties.

Fault causes: material selection; heat treatment selection; design.

Fault effects: tool jamming; tool misalignment; component disfiguration.

Crack detection: die penetration; magnetic particles; ultrasonic.

EVIDENCE REQUIREMENTS

Oral or written evidence of the candidate's ability to describe the advantages and disadvantages of press tool lubricants from within the range.

Oral or written evidence that the candidate can describe the causes and effects of cracks in press tools from within the range.

Oral or written evidence that the candidate can describe two methods of crack detection from those listed in the range.

OUTCOME

- 4. OUTLINE SAFE PRACTICES AND HAZARDS ASSOCIATED WITH WORKING ON POWER PRESSES

PERFORMANCE CRITERIA

- (a) Identification of common causes of accidents associated with working with presses is correct in relation to official statistics.
- (b) Explanation of the use of guards and switches when using presses is correct in terms of the manufacturer's recommendations.

RANGE STATEMENT

Data: company accident statistics; national accident statistics. Machinery; manual presses; power presses.

EVIDENCE REQUIREMENTS

Oral or written evidence that the candidate can identify three common causes of accidents in the use of machinery in the range and how they can be eliminated by the use of guards or foolproofing switches.

ASSESSMENT RECORDS

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

UNIT NUMBER: 2131383

UNIT TITLE: PRESS TOOLING: INTRODUCTION

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:

This module will introduce you to the applications of press tools in the shaping of components. You will also be given an awareness of the types of material and machining processes used in the manufacture of press tools. The module also outlines safety procedures in the use of presses.

CONTENT/CONTEXT Throughout this module safety must be stressed in the use of machinery and equipment.

Many of the procedures can be simulated and demonstrated where appropriate.

Interpretation of:

- manufacturer's standard die sets
- machining processes
- sketches of press tools
- standard procedures for crack detection
- health and safety relating to press tool

Corresponding to Outcomes 1 to 4:

1. The candidate should be able to investigate the reasons for using press tools in the context of repeatability, large volume production, economy of material and accuracy, therefore off-setting the cost of the press tool.

An awareness of the successful design and use of press tools is dependent on a knowledge of:

- (i) construction of different types of presses (hand; foot; single and double acting power presses);

- (ii) the pressure required and power available;
 - (iii) which press type is more suitable for different operations such as blanking, piercing, forming etc.
2. Candidates should know the heat treatment processes such as hardening, annealing, normalising and case hardening and the advantages of such processes applied to the manufacture of press tools.

Candidates should be aware of the basic machining processes and their applications in the manufacture of press tools.

Candidates should have sufficient knowledge of manufacturers' standard parts to sketch a simple press tool assembly using such components as bolsters, bushes, strippers, guide pins and guide plates.

3. Candidates should be aware of common faults occurring in press tools operation such as lack of lubrication, excessive lubrication, cracks caused by poor design or material selection. The candidate should also be aware of common procedures used for crack detection.

Throughout the module the candidate should be made aware of all aspects of health and safety in the use of presses and press tools.

APPROACHES TO GENERATING EVIDENCE This module should be carried out in a situation where the candidates can be directed to use manufacturers' catalogues and text books in an investigative manner. Products from the range should be selected and used to develop understanding of the materials and processes used in their manufacture.

The use of structured worksheets should be a central support of the delivery and assessment of this module. The worksheets should be structured to give information and require the candidate to complete sections relating to items such as equipment, material, processes etc.

The knowledge requirements of the module would be best assessed by short answer questions written within the context of exercise worksheets set in class after practical exercises, demonstrations or simulations.

ASSESSMENT PROCEDURES Centres may use the Instruments of Assessment which are considered by tutors/trainers to be most appropriate. Examples of Instruments of Assessment which could be used are as follows:

Outcomes 1-3-4 Restricted response questions to cover Performance Criteria within each Outcome. An appropriate amount of questions to ensure that all stated ranges are covered.

Outcome 2 An assignment could be allocated to all the Performance Criteria Outcome 2.
The candidate will be furnished with data which would enable an assignment to be produced therefore testing the skills required to abstract and interpret relevant data to obtain the required results.

PROGRESSION This module could form part of the module programmes for National awards in Engineering.

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. Guidelines for Module Writers.
2. SQA's National Standards for Assessment and Verification.
3. For a fuller discussion on assessment issues, please refer to SQA's Guide to Assessment.
4. Procedures for special needs statements are set out in SQA's guide 'Students with Special Needs'.

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