

NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION**STATEMENT OF STANDARDS****UNIT NUMBER:** 2270854**UNIT TITLE:** DESIGN OF WELDED JOINTS

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 AND APPLY STANDARDS RELEVANT TO WELDED JOINTS

PERFORMANCE CRITERIA

- (a) Interpretation of weld symbols used on drawings is correct.
- (b) Selection of a joint configuration is correct in terms of a given welding process.

RANGE STATEMENT

Standards: BS 499; Euro-Norm.

Welding processes: oxy-acetylene; MMA; MAGS; TAGS; Submerged Arc.

EVIDENCE REQUIREMENTS

Written evidence that the candidate can correctly identify welding symbols as detailed in Performance Criterion (a).

Written evidence that the candidate can correctly select and sketch the joint configuration for a given task and welding process as detailed in Performance Criterion (b).

OUTCOME**2. IDENTIFY AND APPRAISE THE MAJOR FACTORS INFLUENCING JOINT DESIGN****PERFORMANCE CRITERIA**

- (a) Explanation of joint design is correct in terms of the weldability of the material.
- (b) Determination of the factors relating to size, shape and joint configurations correct.
- (c) Appraisal of service conditions are clear and comprehensive.

RANGE STATEMENT

Factors: type of material; weldability; size; shape; joint configuration; access; strength; environmental.

Materials: ferrous; non-ferrous.

Service conditions: loading ; atmospheric; corrosive.

EVIDENCE REQUIREMENTS

Written evidence that the candidate can justify the need for a particular joint design in relation to the weldability of the material as detailed in PC (a).

Written evidence that the candidate can assess factors relating to a joint design correctly as detailed in PC (b).

Written evidence that the candidate can make an appraisal of the conditions with regard to the joint in service.

OUTCOME**3. PREPARE A WELD JOINT SPECIFICATION****PERFORMANCE CRITERIA**

- (a) The preparation of a detailed specification of a joint design is correct.

RANGE STATEMENT

Materials: ferrous; non-ferrous.

Joint Design: type of material; thickness of material; welding process; access.

EVIDENCE REQUIREMENTS

Written/graphics evidence that the candidate can prepare a detailed joint specification for a given task, welding process and service conditions, and in addition, all necessary angles, root gaps and root faces must be correct.

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: 2270854

UNIT TITLE: DESIGN OF WELDED JOINTS

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 This half module may be taken as a free-standing module in a wide variety of programmes.

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

This unit will enable you to develop your understanding of the factors associated with the designing of a welded joint. You will also be able to prepare a weld joint specification for specific tasks.

CONTENT/CONTEXT BS499; Parts 1 and 2 should form the basis of this unit. European Standards, as and when they become available, should be introduced and used as soon as practical.

Some reinforcement, and the introduction of the main welding processes in use will be required to augment the elements of joint design. Outcome 1 will require the use of the relevant standards for weld symbols and joint configuration. The use of structured graphics tutorial sheets would be beneficial in the presentation and reinforcement of the use of weld symbols and joint preparation.

Outcome 2. The major factors influencing joint design should be introduced with special emphasis on the type of material and welding process being used. An explanation and some discussion on expected conditions in service, eg fluctuating loading, and environmental conditions.

An appreciation of the stresses occurring in a welded joint both in the welding process and in service. Knowledge of mode of failure of a welded joint will be required with emphasis on stress raisers.

Outcome 3 will require some tutorial work on the preparation of joint specification.

APPROACHES TO GENERATING EVIDENCE In general, the approach should be to develop candidates', insight into the external factors to be considered in the selection of a material for a particular task. The learning programme should be activity-based and candidate-centred.

The use of carefully structured practical worksheets should be a central support to the delivery and assessment of the units.

Throughout the learning programme the candidates should be encouraged to input from their own particular industry and use this as a basis for discussion and conclusion.

ASSESSMENT PROCEDURES Centres may use the Instruments of Assessment which are considered to be most appropriate.

Examples of Instruments of Assessment which could be used, are as follows:

Corresponding to Outcomes 1-3:

1. Written/graphics exercise to assess the candidate's ability to interpret 8 weld symbols and select and sketch a joint configuration for a given task.
2. Assignment report, from given data and service conditions to assess the candidate's ability to:
 - (i) explain the joint design in terms of the weldability of the material;
 - (ii) assess factors relating to size, shape and joint configuration correctly.
3. Prepare a detailed specification for the joint design to a satisfactory standard, from preliminary design sketch and data.

PROGRESSION This unit is to form part of the National Award in Fabrication and Welding Engineering Practice.

Candidates can progress onto an appropriate SVQ in Fabrication and Welding for which the National Award gives a degree of underpinning knowledge. Further progression is onto an Advanced Practice unitised course and then to Higher Certificate in Fabrication and Welding Practice.

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.

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