

Higher National Graded Unit Specification

General Information for Centres

This Graded Unit has been validated as part of the HNC Fabrication, Welding and Inspection award. Centres are required to develop the assessment instrument in accordance with this validated specification. Centres wishing to use another type of Graded Unit or assessment instrument are required to submit proposals detailing the justification for change for validation.

Graded Unit Title: Fabrication, Welding and Inspection: Graded Unit 1

Graded Unit Code: DR37 34

Type of Graded Unit: Examination

Assessment Instrument: Closed-book examination

Credit points and level: 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Purpose: This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HNC Fabrication, Welding and Inspection:

- ◆ develop knowledge and understanding in a range of core and specialist fabrication, welding and inspection applications
- ◆ develop an ability to apply analysis and synthesis skills to the solution of fabrication and welding problems
- ◆ develop a range of transferable and Core Skills
- ◆ develop a range of knowledge and skills relevant to the needs of the fabrication and welding industry

Recommended Prior Knowledge and Skills: It is recommended that the candidate should have completed, or be in the process of completing, the following Units relating to these specific aims prior to undertaking this Graded Unit:

- ◆ Welding Principles and Applications 1 (DR2G 34)
- ◆ Fabrication: Preparation, Joining and Assembly (DR2C 34)
- ◆ Fabrication and Welding Materials (DR2H 34)
- ◆ Inspection Systems (DR26 34)
- ◆ Quality Management: An Introduction (DT8Y 34)
- ◆ Units from one of the four Principles and Technology Limited Optional Sections as selected by the centre

Core Skills: There may be opportunities to gather evidence towards Core Skills in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

General Information for Centres (cont)

Assessment: This examination-based Graded Unit is the Fabrication, Welding and Inspection: Graded Unit. It will consist of a written examination of three hours duration.

An exemplar instrument of assessment and marking guidelines have been produced to indicate the national standard of achievement required at SCQF level 7.

Administrative Information

Graded Unit Code: DR37 34

Graded Unit Title: Fabrication, Welding and Inspection: Graded Unit 1

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Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates

Graded Unit Title: Fabrication, Welding and Inspection: Graded Unit 1

Conditions of Assessment

The assessment is based on an examination paper of two sections, Section A and Section B.

The allocation of marks will be Section A (mandatory section) — 80% of available marks.

Section B (optional section) — 20% of available marks.

A pass grade should be based on a cumulative total of sections A and B.

The examination paper should last three hours.

The examination should be conducted under closed-book conditions but with candidates being allowed access to an examination resource pack as required.

Where a candidate is unsuccessful in the Graded Unit they can be given the opportunity to re-sit another significantly different examination at the earliest opportunity.

The grade given will reflect the candidate's achievement at the first assessment event. A candidate may wish to retake the Graded Unit to improve their grade but this should be based on a significantly different examination.

The examination should be unseen and the assessment should be conducted under controlled and invigilated conditions.

Instructions for designing the assessment task:

The examination should be designed to assess the candidate's critical knowledge and understanding of the topics relating to the specific aims which this Graded Unit is designed to cover. The questions and corresponding marks should be designed in accordance with the ranges indicated in the table that follows. However, the overall total mark for the examination is 100.

Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates (cont)

Topic	Level of knowledge/ understanding	Weighting/ Mark Allocation
Welding Process Principles Welding Applications Process variables	<p>Demonstrates an understanding of welding processes.</p> <p>Understands the process of variables/parameters in welding and weld quality.</p> <p>Selects a weld process/s for specified application.</p>	20%
Engineering Drawing Fabrication Preparation Templates Joining and Assembly	<p>Interprets information and identifies symbols used in fabrication engineering drawings.</p> <p>Describes marking methods used in the construction of cambers and layouts used in the fabrication industry.</p> <p>Describes cutting and mechanical joining processes.</p> <p>Describes the methods of work holding, clamping and controlling distortion.</p>	20%
Metals and Alloys Basic Metallurgy Weldability Material Failure	<p>Recognises the metallurgical structures and changes affecting metals and alloys.</p> <p>Explains the factors affecting the weldability of metals and alloys.</p> <p>Explain the basic principles of failure in materials.</p>	20%
Standards Types of Inspection Dimensional Checks NDT	<p>Specifies the role of standards and types of inspection in the fabrication industry.</p>	20%

Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates (cont)

Topic	Level of knowledge/ understanding	Weighting/ Mark Allocation
Relationship between Quality and Inspection Quality Assurance Quality Control Control Methods Quality Costs	<p>Identifies the components of dimensional inspection techniques.</p> <p>Identifies surface methods of non-destructive testing and their safe use.</p> <p>Identifies sub-surface methods of non-destructive testing and their safe use.</p> <p>Explains the fundamental principles of QA and QC.</p> <p>Understands the application is ISO 9000 standards.</p> <p>Analyses and selects appropriate methods of control for a given process.</p> <p>Categorises, analyses and interprets different quality costing methods.</p>	

Section B

Topic	Level of knowledge/ understanding	Weighting/ Mark Allocation
Principles and Technology Limited Optional Units	Reflects the Outcomes of Units selected	20%

The structure of the assessment should normally conform to the following:

Knowledge and understanding	20% of available marks
Applications	40% of available marks
Analysis and synthesis	40% of available marks

The examination will be marked out of 100. Assessors will aggregate the marks achieved by the candidate to arrive at an overall mark for the examination. Assessors will then assign a grade to the candidate for this Graded Unit based on the following grade boundaries:

- ◆ A = 70% – 100%
- ◆ B = 60% – 69%
- ◆ C = 50% – 59%

Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates (cont)

Guidance to Centres

Centres are encouraged to study this Graded Unit specification and the associated assessment exemplar carefully before embarking on the writing of any HNC Fabrication, Welding & Inspection Examination paper.

The main purpose of the Graded Unit is to assess candidates' abilities to solve problems that involve the integration of knowledge and skills across different areas of Fabrication and Welding Engineering. In addition limited opportunities are also provided to assess Core Skills. Any such assessment of these skills should be set within the context of fabrication and welding.

Integration involves an ability to apply knowledge, understanding and skills obtained in one subject area to another area. For example, it is well known that good knowledge and skills in Welding Principles is essential in solving many problems in Materials and vice versa. This does not mean that the Graded Unit Examination should not involve recall of knowledge, only that this should be limited to avoid duplication with what is being assessed in individual Units.

The Unit consists of a three hour examination including a notional study time of 37 hours to allow candidates to practise solving problems which involve the transfer of knowledge and skills across the Mandatory and Limited Optional Principles and Technology sections. Centres should use a range of formative assessments to support such skills development.

Candidates who meet the minimum Evidence Requirements will have their achievement graded as a C (competent), A (highly competent), or B (somewhere between A and C). The grade related criteria to be used to judge candidate performance for this Graded Unit is specified in the following table:

Grade A	Grade C
<p>Is a seamless, coherent piece of work or exam script which consistently:</p> <ul style="list-style-type: none"> ◆ interprets and understands the question in a way which demonstrates insight and clear understanding of issues and relationships ◆ answers demonstrate a comprehensive analysis and evaluation of relevant information ◆ responses are logically structured and coherently expressed demonstrating consistent use of correct terminology 	<p>Is a co-ordinated piece of work or exam script which:</p> <ul style="list-style-type: none"> ◆ interprets and understands the question in a way which enables the candidate to meet the basic criteria required ◆ answers demonstrates a limited analysis, evaluation and explanation of the question and other relevant information ◆ responses are uneven and convey limited understanding although some relevant points are made

Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates (cont)

Grade A	Grade C
<ul style="list-style-type: none"> ◆ is clear and well structured throughout with language and terminology used of a consistently high standard in terms of level, accuracy and technical content 	<ul style="list-style-type: none"> ◆ is satisfactory structured with language and terminology used adequately, although not always consistently, in terms of level, accuracy and technical content
<ul style="list-style-type: none"> ◆ consolidates and integrates required knowledge and skills, linking concepts and ideas relating answers explicitly to the question 	<ul style="list-style-type: none"> ◆ consolidates and integrates knowledge and skills but may lack continuity and consistency and fail to show clear links to concepts and ideas
<ul style="list-style-type: none"> ◆ convincingly argues and shows links between discussions and conclusions demonstrating comprehensive knowledge and understanding as well as analysis and evaluation skills 	<ul style="list-style-type: none"> ◆ argues and justifies conclusions in an acceptable way but these conclusions may lack reasoned understanding, may not link well to discussions and may show limited knowledge
<ul style="list-style-type: none"> ◆ provides evidence of possible alternative approaches and arguments as well as understanding of different interpretations 	<ul style="list-style-type: none"> ◆ is likely to show only one approach and limited understanding of different interpretations

Candidates with Additional Support Needs

This Graded Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative assessment arrangements. For information on these, please refer to the SQA document *Guidance on Alternative Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on the SQA website www.sqa.org.uk.