Higher National Unit specification

General information for centres

Unit title: Glass Fusing: Advanced Techniques

Unit code: F1W4 35

Unit purpose: This Unit is designed to enable the candidate to develop design skills and advanced skills and knowledge related to fusing glass. It is suitable for candidates studying glasswork or working in the glasswork industry.

On completion of the Unit the candidate should be able to:

1 Research and investigate glass designs.
2 Produce designs and samples to meet a brief.
3 Calculate firing schedules.
4 Prepare glass and kiln for complex fusing process.
5 Produce complex fused glass artefacts.

Credit points and level: 2 HN credits at SCQF level 8: (16 SCQF credit points at SCQF level 8*)

**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.*

Recommended prior knowledge and skills: While access is at the discretion of the centre, it is recommended that candidates have gained the Higher National Unit: F1X8 34 *Glass Fusing Techniques.*

Core Skills: There are opportunities to develop the Core Skills of Problem Solving, IT, Numeracy and Working with Others at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: Assessment will be holistic. Outcome 1 will require the candidate to produce evidence of research. Outcome 2 requires the candidate to develop designs and samples of glass fusing. Outcomes 3, 4 and 5 will involve practical-based activities which will require the candidate to produce fused glass artefacts. Candidate performance will be recorded on observation schedules or checklists.

Higher National Unit specification: statement of standards

Unit title: Glass Fusing: Advanced Techniques

Unit code: F1W4 35

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Research and investigate glass designs

Knowledge and/or Skills

- Research skills
- Glass designs
- Materials
- Glass fusing techniques
- Health and safety

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and Skills by showing that they can provide a portfolio of fused glass designs, materials and techniques used. The portfolio must include a minimum of 10 different designs, each of which should be accompanied by technical notes and visuals and should include analysis of the materials and techniques used.

Assessment Guidelines

Candidates could be asked to research fused glass artefacts such as glass panels. Pro formas could be used to record technical notes and candidates could gather all researched information into a portfolio.

Higher National Unit specification: statement of standards (cont)

Unit title: Glass Fusing: Advanced Techniques

Outcome 2

Produce designs and samples to meet a brief

Knowledge and/or Skills

- Design process
- Design drawings
- Glass fusing techniques
- Materials
- Interpretation of designs

Evidence Requirements

Candidates will need evidence to demonstrate their Knowledge and Skills by showing that they can use a variety of design processes to produce a minimum of six fused glass design ideas in response to a design brief. This requires candidates to provide three related design ideas to meet a brief. Each design idea should consist of a clear visual and a technical specification which details the type of glass and the colours to be used. It should also clearly indicate shape, a minimum of two views and a minimum of one style detail on each artefact.

The candidate should produce a full specification drawing of their chosen final design solutions and this design solution should be accompanied by a minimum of three fused glass samples to illustrate the type of fusing techniques, colours and materials to be used.

Assessment Guidelines

Candidates could be asked to provide three related fused glass artefacts designs for an interior following a given theme. This could be holistically assessed with Outcome 4 and 5.

Outcome 3

Calculate firing schedules

Knowledge and/or Skills

- Fusing temperatures and times
- Annealing temperatures and times
- Types of glass
- Thicknesses of glass
- Coefficient of expansion of types of glass

Higher National Unit specification: statement of standards (cont)

Unit title: Glass Fusing: Advanced Techniques

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and skills by showing that they can accurately calculate:

- firing schedules for glass fusing. Calculations for kiln programming should be within a range of 10 degrees above or below the manufacturer's recommendations for the types and thicknesses of glass used for fusing.
- soak times within a range of 5 minutes above or below the manufacturer's recommendations
- annealing temperatures within a range of 10 degrees above or below manufacturer's recommendations for the area and thickness of glass and the types of glass used
- candidate log book detailing processes and calculations.

Candidate performance should be recorded on an observation schedule which should include demonstration of the candidate wearing of Personal Protective Equipment at all times during the Unit and working in a safe manner without risk to themselves or others.

Assessment Guidelines

This could be linked to the practical task of Outcomes 4 and 5 and may be completed on pre-printed forms or in a format devised by the candidate.

Outcome 4

Prepare glass and kiln for complex fusing process

Knowledge and/or Skills

- Kiln preparation
- Firing methods
- Glass preparation
- Shelf preparation
- Separator types
- Health and safety

Evidence Requirements

Candidates will need to provide evidence to demonstrate their advanced Knowledge and Skills by showing that they can prepare and clean a kiln to produce a dust free chamber.

Candidates must prepare glass and kiln for three different artefacts. In all cases glass must be clean and free from grease marks prior to firing. Candidates must select an appropriate liquid, powder or fibre separator which prevents glass adhesion to the kiln shelf after firing. Candidates must be able to successfully fire the kiln to achieve the fused results required by the chosen design. Candidates should record their glass fusing activities in a log book.

Health and Safety procedures must be adhered to throughout which should include demonstration of the candidate wearing of Personal Protective Equipment at all times during the Unit and working in a safe manner without risk to themselves or others.

Candidate performance should be recorded on an observation schedule.

Assessment Guidelines

This Outcome could be jointly assessed with Outcome 3 and 5. See Assessment Guidelines after Outcome 5 for further guidance.

Outcome 5

Produce complex fused glass artefacts

Knowledge and/or Skills

- Stress testing techniques
- Fusing temperatures and times
- Annealing temperatures and times
- Types of glass
- Coefficient of expansion of types of glass
- Compatibility testing
- Health and safety

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and Skills by showing that they can conduct stress testing and compatibility testing for three different artefacts each using a minimum of two different types of glass. The results of these tests should indicate that glass was compatible and stress free.

The artefacts should demonstrate the candidate's ability to fuse the types of glass without gaps, bubbles or devitrification type marks. Firing schedules should be calculated within +/- 10 degrees for the fusing of various types of glass which clearly show the correct temperatures; soak times within +/- 5 minutes and correct annealing temperatures within +/- 10 degrees of the manufacturer's recommendations for the type and thickness of glass used in each case.

Candidates should record technical notes and activities in a log book.

Health and Safety procedures must be adhered to throughout and should include demonstration of the candidate wearing of Personal Protective Equipment at all times during the Unit and working in a safe manner without risk to themselves or others.

Candidate performance should be recorded on an Observation Schedule.

Assessment Guidelines

The candidate could be assessed holistically by producing a set of related glass artefacts such as panels or pieces of glass which may be worked in the future to form, for example, a bowl. These artefacts should be stress free and compatible. As part of the process of production, the candidate should clean and prepare the kiln, and calculate firing schedules which could be on pre-printed pro formas. Throughout the Unit candidate activities, calculations and technical notes should also be recorded in a candidate log book.

Administrative Information

Unit code: F1W4 35

Unit title: Glass Fusing: Advanced Techniques

Superclass category: WF

Original date of publication: August 2007

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Glass Fusing: Advanced Techniques

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit in the HND Art Glass Production Group Award. Its purpose is to develop the candidate's design skills and glass fusing skills. Candidates should become competent in dealing with glass fusing temperatures and times; annealing temperatures and times of various types of glass and their coefficient of expansion (COE) and how to conduct compatibility testing.

Electric and/or Gas fired kilns may be used.

The importance of cleanliness and tidiness in the work area should be stressed throughout the Unit. Candidates should be encouraged not only to follow Health and Safety requirements in the workplace but to research any specific manufacturer's instructions supplied with equipment.

Types of glass which could be used within this Unit could include, float glass, bullseye glass, spectrum fusible glass, uroboros fusible glass, artista fusible glass and other tested compatible glasses. Manufacturer's catalogues and websites could be used as a source of reference for materials and equipment.

Throughout the Unit candidates will require to communicate and work with others in a workshop environment. They will be required to co-operate and co-ordinate their work with others to ensure that everyone has the opportunity to use specialist equipment.

Guidance on the delivery and assessment of this Unit

Supporting information for each Outcome is detailed below:

Outcome 1

Candidates could be directed to specific websites for researching glass artefacts or could be encouraged to visit and photograph exhibitions, galleries and museums to compile a portfolio of glass design information.

Outcome 2

Candidates should be able to show the development of their design ideas and should be encouraged to take an experimental approach to producing samples.

Outcome 3

Candidates will already be familiar with calculating firing schedules and this should be further developed with experimental samples are produced.

Higher National Unit specification: support notes (cont)

Unit title: Glass Fusing: Advanced Techniques

Outcome 4

Candidates should be guided by the tutor on the preparation of kilns and kiln shelves, the procedures to be followed for kiln firing and instructed in the use of different types of separators which may be used for glass fusing.

Outcome 5

Fused glass artefacts should be demonstrated to the candidate by the tutor and evidence of successful fusing would be the item itself, evidence for the assessment of understanding of the process may take the form of a suitable checklist. The tutor should also demonstrate compatibility and stress testing.

Learning and teaching materials should be accessible and where applicable positively promote equality and cultural diversity. Throughout the Unit the practical processes should be demonstrated by the tutor and candidates should be encouraged to experiment and develop their practical skills.

Opportunities for developing Core Skills

There are opportunities to develop the Core Skills of Problem Solving, Numeracy, IT and Working with Others at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

The Core Skill of Problem Solving, could be developed and enhanced as candidates undertake this Unit. Candidates will plan, organise and complete a task and evaluate the quality of the completed object at each stage in the production process. This will be recorded throughout in their log books. During Outcomes 2 and 3 when they will be required to plan and organise the materials required to prepare a kiln and glass prior to firing.

Throughout the Unit candidates will require to communicate and work with others in a workshop environment. They will be required to co-operate and co-ordinate their work with others to ensure that everyone has the opportunity to use specialist equipment. Additionally the health and safety requirements of the workshop require co-operation within the workshop environment.

There are also opportunities to develop the Core Skill of Numeracy. Candidates will need to perform calculations relating to surface areas and will calculate firing schedules in Outcome 2. Additionally candidates will have to read charts and diagrams relating to temperature.

The Core Skill of IT could be developed through the use of the internet for research purposes, use of digital photography to record each stage of manufacture and the use of word processing software to keep technical notes and maintain a log book. Additionally candidates could use CAD software for Outcome 2.

Higher National Unit specification: support notes (cont)

Open learning

This Unit is not suitable for Open learning due to the specialist equipment required.

For further information and advice, please refer to the SQA guide *Assessment and Quality Assurance for Open and Distance Learning* **www.sqa.org.uk.**

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* **(www.sqa.org.uk)**.

General information for candidates

Unit title: Glass Fusing: Advanced Techniques

In this Unit you will learn how to set up a kiln which you will use to fuse glass. When fusing glass it is of vital importance to have knowledge of fusing temperatures and times, and cooling (annealing) temperatures and times for various types and thicknesses of glass, and these are also covered across the Unit.

You will also learn of the types of glass suitable for fusing, the Coefficient of Expansion (COE) of these glasses, compatibility testing, kiln preparation and kiln firing.

Glass preparation, kiln shelf preparation and the use of different types of separator are also covered in the Unit. You will learn of the health and safety requirements pertaining to hot glass working and the use of Personal Protective Equipment.

In addition to these practical glass making skills you will also develop your skills in designing fused glass objects. You will be assessed on your designs which you will then develop into fused glass artefacts. Your activities will be observed by your tutor and will be recorded.

You will also have the opportunity to practise the process of glass fusing using a selection of glass prior to producing assessment material.

By the completion of this Unit you will have produced fused glass items such as panels and glass which can be used at a later time to form a functional item.

In undertaking this Unit you will be given the opportunity to develop your Core Skills in Numeracy, Working with Others, IT and Problem Solving at SCQF level 6.