



Higher National Unit specification

General information for centres

Unit title: Glass Fusing Techniques

Unit code: F1X8 34

Unit purpose: This Unit is designed to enable the candidate to develop skills and knowledge related to fusing glass. It is suitable for candidates wishing to work in the Glasswork industry.

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

- 1 Calculate firing schedules for various types of glass.
- 2 Prepare glass and kiln for fusing process.
- 3 Produce fused glass artefacts.

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.*

Recommended prior knowledge and skills: While access is at the discretion of the centre, candidates would benefit from having knowledge and skills in glass cutting techniques at SCQF level 5 or 6.

Core Skills: There are opportunities to develop the Core Skills of Problem Solving, Numeracy and Working with Others at SCQF level 5 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 with one practical task being assessed. Outcome 1 will be based on the calculation of firing schedules for glass fusing. Outcome 2 and Outcome 3 will involve a practical-based activity and the use of an observation schedule or checklist to record health and safety.

Higher National Unit specification: statement of standards

Unit title: Glass Fusing Techniques

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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

Calculate firing schedules for various types of glass

Knowledge and/or Skills

- ◆ Fusing temperatures and times
- ◆ Annealing temperatures and times
- ◆ Types of glass
- ◆ Coefficient of Expansion (COE) of types of glass

Evidence Requirements

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

- ◆ firing schedules for kiln programming within a range of 10 degrees above or below manufacturers' recommendations for the types of glass used for slumping which clearly show the correct temperatures
- ◆ soak times within a range of 5 minutes above or below manufacturers' recommendations
- ◆ correct annealing temperatures within a range of 10 degrees above or below manufacturers' recommendations for the area of glass and the types of glass used

Assessment Guidelines

This could be linked to the practical task of Outcomes 2 and 3 and may be completed on pre-printed forms or in a format devised by the candidate.

Higher National Unit specification: statement of standards (cont)

Unit title: Glass Fusing Techniques

Outcome 2

Prepare glass and kiln for fusing process

Knowledge and/or Skills

- ◆ Kiln preparation
- ◆ Firing methods
- ◆ Glass preparation
- ◆ Kiln shelf preparation
- ◆ Use of types of separator
- ◆ Health and safety

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and Skills by showing that they can prepare and clean a kiln to produce a dust free chamber. Glass must be clean and free from grease marks prior to firing. Candidates must select a liquid, powder or fibre separator which prevents glass adhesion to the kiln shelf after firing and to successfully fire the kiln to achieve the results which meet the requirements of the given firing task. Health and Safety procedures must be adhered to throughout.

Candidate's performance should be recorded on an Observation Schedule.

Assessment Guidelines

This Outcome could be jointly assessed with Outcome 1 and 3. See Assessment Guidelines after Outcome 3 for further guidance.

Higher National Unit specification: statement of standards (cont)

Unit title: Glass Fusing Techniques

Outcome 3

Produce fused glass artefacts

Knowledge and/or Skills

- ◆ Stress testing techniques
- ◆ Fusing temperatures and times
- ◆ Annealing temperatures and times
- ◆ Types of glass
- ◆ Coefficient of Expansion (COE) 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 and also produce artefacts using three different types of glass. These 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 manufacturers' recommendations for the types and thickness of glass used. Health and Safety procedures must be adhered to throughout.

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

Assessment Guidelines

The candidate could be assessed holistically by producing a panel or a coaster or 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, calculate firing schedules which could be pre-printed pro formas and this could also be recorded in a candidate log book and in an observation schedule. The candidate could fire a kiln successfully to achieve the desired end result. The candidate would be required to follow health and safety guidelines throughout the Unit and this would be recorded in an Observation schedule. The candidate should demonstrate the ability to work in a manner which conforms to the health and safety requirements of the workshop which would include the wearing of Personal Protective Equipment at all times during the Unit and working in a safe manner without risk to themselves or others.

Administrative Information

Unit code: F1X8 34
Unit title: Glass Fusing Techniques
Superclass category: WF
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Version	Description of change	Date

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Higher National Unit specification: support notes

Unit title: Glass Fusing 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 40 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit in the HNC/HND Art Glass Production Group Awards frameworks. Its purpose is to introduce candidates to glass fusing temperatures and times; annealing temperatures and times of various types of glass and their 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 also to research any specific manufacturers instructions supplied with equipment. Manufacturer's catalogues and websites could be used as a source of reference for materials and 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.

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

This Unit is a mandatory Unit. It could be delivered in the first year of an HND or in HNC. Candidates should have the opportunity to practise and to produce fused samples of glass until they have achieved a level of competence where they can produce a selection of fused glass of varying sizes and designs.

This Unit may stand alone or be integrated with another appropriate Unit.

Outcome 1

The basic methods of calculating firing schedules should be introduced to the candidate by Tutor demonstration and time should be allowed for thorough experimentation.

Outcome 2

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.

Higher National Unit specification: support notes (cont)

Unit title: Glass Fusing Techniques

Outcome 3

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.

Opportunities for developing Core Skills

Some elements of the Core Skill of Problem Solving, namely planning and organising 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. 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. 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.

There are also elements of the Core Skill of Numeracy, namely Calculation of surface areas which could be developed and enhanced as candidates undertake this Unit. Candidates will calculate firing schedules in Outcome 1 to complete a task.

Open learning

This Unit is not suitable for Open learning due to the equipment required and workshop health and safety requirements inherent in the process.

For further information and advice, please refer to the SQA document *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 Techniques

In this Unit you will learn how to set up a kiln which you will use to fuse glass. When you are fusing glass you have to learn about fusing temperatures and times, cooling (Annealing) temperatures and times for various types of glass. You will also learn of the types of glass suitable for fusing, Coefficient of Expansion (COE) of these glasses, compatibility testing, kiln preparation and kiln firing.

You will learn about glass preparation, kiln shelf preparation and the use of different types of separator as well as the health and safety requirements pertaining to hot glass working and the use of Personal Protective Equipment.

You will be assessed by practical projects and by the use of observation checklists which will be completed by your Tutor.

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

On completion of this Unit you will have produced fused glass items such as panels, coasters or glass which can be used at a later time to form a functional item.

In undertaking this Unit you will develop your Core Skills in Numeracy, Working With Others and Problem Solving.