National Unit Specification: general information

UNIT Conservation Masonry (Intermediate 2)

NUMBER D3VJ 11

COURSE

SUMMARY
On completion of this unit, the candidate will be competent in mixing hot lime mortar and using the lime mortar in construction and conservation projects.

OUTCOMES
1 Mix gauged hot lime mortar.
2 Re-point ashlar masonry structures and brickwork using lime mortars.
3 Use lime-based grouts for joints and voids.
4 Carry out complex repair and conservation work using lime mortars in accordance with current accepted conservation practice and guidelines.

RECOMMENDED ENTRY
This unit is designed to compliment other SVQs in Stonemasonry at Level 3 and candidates would normally be expected to be experienced stonemasons and should have completed unit D3VH-11 Preparing Hydraulic Lime Mixes and Building and Re-pointing Rubble Masonry Using Lime Mortars.

CREDIT VALUE
1 Credit at Intermediate 2.

Administrative Information

Superclass: TG

Publication date: January 2001

Source: Scottish Qualifications Authority 2001

Version: 01

CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Conservation Masonry (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1
Mix gauged hot lime mortar.

Performance criteria

a) Basic hand tools and equipment are correctly selected and workspace identified and prepared before undertaking works.
b) The limes, aggregates and additives for the mix are accurately selected and correctly measured by volume and weight to the given specification of the mix.
c) The correct mixing techniques are used and fluids are added in the correct sequence according to the given specification.
d) Lime materials, aggregates and additives are handled and stored in accordance with current practice and relevant health and safety legislation.
e) The appropriate health and safety practices are correctly applied when working with quick lime.

Note on range for the outcome

Limes: non-hydraulic lime –putty; gauged hydraulic hot limes.

Aggregates: coarse sands; fine sands; crushed stone; crushed brick.

Mixes: coarse stuff; fine stuff.

Additives: pozzolans; common additives;

Fluids: water; lime water; lime wash.

Equipment: scales; mixing equipment; hand tools; safety wear.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

National Unit Specification: statement of standards (cont)

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OUTCOME 2
Re-point ashlar masonry structures and brickwork using lime mortars

Performance criteria
a) The original structure characteristics and behaviour are correctly identified.
b) An appropriate methodology is identified.
c) Tools and equipment for the given task are selected and used correctly.
d) An appropriate mortar mix is designed for the given task.
e) The materials for the mix are accurately selected and correctly measured by volume and weight to the given specification of the designed mix.
f) Joints are correctly prepared to receive traditional lime mortar.
g) Pointing work is carried out to match the identified methodology.
h) Work area and equipment are appropriately cleaned and equipment stored safely in accordance with current practice.

Note on range for the outcome
Structures: ashlar masonry; historic brickwork.

Materials: hot lime mortars; cold lime mortars; coarse stuff and fine stuff; hydraulic; non-hydraulic mortars; common additives.

Equipment: hand tools; safety wear.

Basic hand tools: pointing trowels and keys; chisels – clourer, mel point, dooking iron, lifter, splitter; hawk; churn brush; stipplier, drags and larrys; floats; hammer – brick, club, carvers mel; tile trowel; bricklayers trowel; harling trowel.

Evidence requirements
Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

OUTCOME 3
Use lime-based grouts for joints and voids.

Performance criteria
a) The original structure characteristics, materials and behaviour are correctly identified.
b) The suitability of the structure for grouting work is established.
c) An appropriate methodology is identified and a specification set.
d) Tools and equipment for the given task are selected and used correctly.
e) An appropriate mortar mix is designed for the given task.
f) The materials for the mix are accurately selected and correctly measured by volume and weight to the given specification of the designed mix.
g) Masonry is correctly prepared to received grout.

h) Grouting work carried out to match the identified methodology.
i) Work area and equipment are appropriately cleaned and equipment stored safely in accordance with current practice.

Note on range for the outcome
Structures: ashlar with joggled joints; formal arch construction; rubble vaulting; mass masonry walling.

Materials: gauged hot lime grouts; cold lime grouts; casein grouts; coarse and fine sand grouts.

Equipment: hand tools; safety wear.

Basic hand tools: pointing trowels and keys; chisels – clourer, mel point, dooking iron, lifter, splitter; hawk; churn brush; stipplier, drags and larrys; floats; hammer – brick, club, carvers mel; tile trowel; bricklayers trowel; harling trowel.

Evidence requirements
Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

OUTCOME 4
Carry out complex repair and conservation work using lime mortars in accordance with current accepted conservation practice and guidelines.

Performance criteria
a) The original structure characteristics, materials and behaviour are correctly identified.
b) An appropriate methodology is identified and a specification set.
c) Tools and equipment for the given work activity are selected and used correctly.
d) Stone is prepared to match existing finishes and detailing as laid out in accordance with the identified methodology.
e) An appropriate mortar mix is designed for the given work activity.
f) The materials for the mix are accurately selected and correctly measured by volume and weight to the given specification of the designed mix.
g) Masonry is correctly prepared to receive grout.
h) Appropriate protective steps are taken to protect and cure the mortar in accordance with identified methodology and specification.
i) Work area and equipment are appropriately cleaned and equipment stored safely in accordance with current practice.

National Unit Specification: statement of standards (cont)

UNIT Conservation Masonry (Intermediate 2)

Note on range for the outcome

Work activities: indenting masonry components; surface repairs of decayed stonework; surface repairs of moulded stonework by rebuilding profiles with brick, tile, slate or stone slips; lime sheltercoats used as sacrificial protection for friable stonework; background repair work on rubble for render and harling work; use of proprietary repair mortars.

Basic hand tools: pointing trowels and keys; chisels – clourer, mel point, dooking iron, lifter, splitter; hawk; churn brush; stipplier, drags and larrys; floats; hammer – brick, club, carvers mel; tile trowel; bricklayers trowel; harling trowel.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

EVIDENCE REQUIREMENTS FOR THE UNIT

Outcome 1

Evidence of actual performance is needed to show the candidate can work individually to mix hot lime mortar using materials and tools across the range.

All working practices must be in accordance with current and relevant health and safety legislation and regulations.

Outcome 2

Performance evidence is needed to show the candidate can use the correct tools and equipment in a safe manner in order to use the range of lime mortars for re-pointing ashlar masonry and historic brickwork.

All working practices must be in accordance with current and relevant health and safety legislation and regulations.

All the performance criteria must be met and all items in the range statement covered.

Outcome 3

Evidence of actual performance is needed to show the candidate can use the correct tools and equipment in a safe manner in order to use the range of lime grouts for grouting masonry and voids across the range of structures.

All working practices must be in accordance with current and relevant health and safety legislation and regulations.

All the performance criteria must be met and all items in the range statement covered.

Outcome 4

Performance evidence is needed to show the candidate can carry out complex repairs and restoration work according to the specification across the range of structures and finishes described in the range statement.

National Unit Specification: statement of standards (cont)

UNIT Conservation Masonry (Intermediate 2)

All working practices must be in accordance with current and relevant health and safety legislation and regulations.

All the performance criteria must be met and all items in the range statement covered.

National Unit Specification: support notes

UNIT Conservation Masonry (Intermediate 2)

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

The candidate successfully completing this unit will be given underpinning knowledge relating to the use of hot lime mortars, pointing of ashlar masonry and brickwork, lime grouting of masonry components and the complex repair and restoration of traditional masonry structures. Particular attention will be given to current accepted good practice in conservation stonemasonry in a wide range of contexts.

The unit will be offered to candidates from the construction and related service industries and trades. The skills are transferable within different working environments but the unit is aimed at candidates whose normal place of work would be a site, a restoration project or a similar working environment.

The range statement is applicable to all areas of construction or other related industries but specifically includes the safe working practices associated with the hazard represented by working with lime based mortars.

The unit deals specifically with the use of lime-mortars and with conservation of traditional masonry but is complimented by other building units in Stonemasonry.

With regard to specific outcomes, the underpinning knowledge delivered in the unit will cover:

Outcome 1

The lime cycle; the nature and characteristics of quick lime and hot lime; the specific risks, hazards and safety practices associated with working with quick lime and hot lime; the various applications of hot lime mixes; storage and mixing requirements; historic uses of quicklime and the implications for conservation; lime specifications.

The candidate must mix 10 litres of hot lime and be 100% free of unmixed dry sand. Fresh, hot, pure lime mortar course stuff should be 100% blended with hydraulic lime which is which is added after initial slaking. Un-slacked quick lime inclusions are acceptable in the mixed mortar. The minimum amount of water should be added and the result should be plastic and workable ready for use with no colour variation.

The following safety requirements apply: HSW (Health and Safety at Work etc) Act; COSSH (Control of Substances Hazardous to Health) Regulations; Manual Handling Operations. In addition, candidates will be made aware of the terms of The Stirling Charter (for the Conservation of Scotland's Building heritage).

Outcome 2

The candidate must repoint half a square metre of ashlar masonry and the mortar is to be cured to match the original behaviour and characteristics of the original. The candidate must also repoint half a square metre of brick work in the same manner with the mortar cured to match.

Cementitious mortars are not removed if this will cause damage to the original work. All loose material and vegetation, dust and debris is removed. Mortar is to be knocked up to specification ready for use. Suitable curing techniques are employed.

Ashlar and brick faces are to be 100% clean and free of staining. Tools and work area are cleaned and reinstated.

The techniques of evaluating structures; reasons for shrinkage in lime mortars and the means of avoiding shrinkage; stone types and their characteristics and behaviours; special techniques for pointing and re-pointing ashlar masonry and brickwork; problems associated with repairing ashlar masonry and brickwork.

Outcome 3
The differing qualities and applications of sands; water content; objectives, possibilities, constraints and limitations of grouting; historical use of grouting; modern conservation practices and techniques; risks and hazards associated with grouting.

Candidates must prepare grout joints and beds within a masonry building exercise selected from the range. The candidate must use the correct tools and identify and mix the correct materials. All joints and beds are to be 2 courses of ashlar (half a square metre) are filled with grout mortar and pointed on completion.

The correct protective equipment and tools are selected and the masonry assessed for its suitability for grouting. The grout is to be mixed without an excess of water but will allow flow into joints and porous materials. Adequate methods of preventing the escape of liquid grout are employed. Masonry joggles are cut to aid the filling of joints and beds and these are tamped and re-filled if necessary. Shrinkage of the mortar is to be monitored and the mortar to be cured to match the original work.

The following safety requirements apply: HSW (Health and Safety at Work etc) Act; COSSH (Control of Substances Hazardous to Health) Regulations; Manual Handling Operations. In addition, candidates will be made aware of the terms of The Stirling Charter (for the Conservation of Scotland's Building heritage).

Outcome 4
Current accepted conservation practices and guidelines; applied conservation rationale; intervention levels; behaviour of lime mortars – prospect, location, climate; interaction of lime with other materials.

Activity 1 – Indenting masonry components.

Candidates must indent a new ashlar dimension stone into an existing panel. Candidates must select and mix a suitable lime mortar to match the existing. An ashlar block of 450mm x 100mm x 250mm is indented into a panel correctly on the building line. The stones are dimensioned to produce joints to match the existing by +/- 1/2mm. The stone must be exactly on the building line and must match exactly the existing direction of coursing. Beds are to be completely filled with joints and internal voids are not less than 95% filled with grout. These joints are to be pointed with no lime staining visible.

National Unit Specification: support notes (contd)

UNIT Conservation Masonry (Intermediate 2)

Activity 2 – Surface repairs of decayed stonework

Candidates must prepare and repair 1 ashlar stone and 1 corner or window rybat with decayed masonry components in line with the current conservation and the specification. The repair work should 10mm back from the finished surface.

Activity 3 – Surface repairs of moulded stonework by rebuilding profiles with brick.

Candidates must prepare and repair a half a linear metre of carved or moulded masonry components. Templates are suitable to match the profile to be repaired +/- 1mm. Repair work should be 10mm back from the finished surface. The finished repaired surface should be +/- 1mm in alignment with the original and junctions between repairs and original are perfectly aligned.

Activity 4 – Lime sheltercoats used as sacrificial protection for friable stonework.

Candidates must mix and correctly apply a lime shelter coat to half a square metre of friable stonework. This stonework could be plain or carved surfaces. 100% coverage must be achieved.

Activity 5 – Background repair work on rubble for render and harling work.

The candidate must use a traditional method to repair one square metre of rubble masonry backgrounds. The candidate must also prepare the rubble masonry to receive two dash coats of lime harling. The lime harling is to be applied as per the specification.

Candidates should assess and re-point and re-point half a square metre of traditional rubble masonry of varying joint widths (<75mm and >5mm) using traditional lime mortar. Original work is taken into account and joints wider than 15mm and/or deeper than 25mm are appropriately pinned. The work should be properly protected during the curing process.

Activity 6 – Use proprietary repair mortars

The candidate must apply two coats of traditional lime harling to a one square metre of prepared background. The candidate must also give due recognition to health and safety for the candidate and the work area throughout.

The following safety requirements apply, HSW (Health and Safety at Work etc) Act; COSSH (Control of Substances Hazardous to Health) Regulations; Manual Handling Operations. In addition, candidates will be made aware of the terms of The Stirling Charter (for the Conservation of Scotland's Building heritage).

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The achievement of skills and underpinning knowledge required for this unit will be assisted by the provision of information sources in the form of: oral and/or written instructions; graphic and photographic materials; technical information and examples from manufacturers of pre-mix; codes of practice; building standards; statutory regulations; hands-on examination of sound and decayed lime-based mortars in traditional masonry structures.

National Unit Specification: support notes (contd)

UNIT Conservation Masonry (Intermediate 2)

Tutors will demonstrate practical elements step-by-step until the candidate feels competent enough to attempt them on his/her own. The requirement to adopt safe working practices and comply with safety legislation will be emphasised throughout.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Outcome 1 PC (a – e) Practical exercise and structured questions
The candidate will be presented with a practical exercise to test competence in mixing gauged hot lime mortar.

Satisfactory performance will be demonstrated by the candidate meeting the performance criteria and evidence requirements including safe working practices when working with hot lime mortars.

Where evidence of underpinning knowledge cannot be inferred from the candidate's performance in the practical exercise, structured questions could be used to allow the candidate to cover gaps.

Outcome 2 PC (a – e) Practical exercise and structured questions
The candidate will be presented with a practical exercise to test competence in re-pointing ashlar masonry and historic brickwork.

Satisfactory performance will be demonstrated by the candidate meeting the performance criteria and evidence requirements including compliance with a predetermined specification for the work.

Where evidence of underpinning knowledge cannot be inferred from the candidate's performance in the practical exercise, structured questions could be used to allow the candidate to cover gaps.

Outcome 3 PC (a – e) Practical exercise and structured questions
The candidate will be presented with a practical exercise to test competence in grouting joints, beds and voids.

Satisfactory performance will be demonstrated by the candidate meeting the performance criteria and evidence requirements including compliance with a predetermined specification for the work.

Where evidence of underpinning knowledge cannot be inferred from the candidate's performance in the practical exercise, structured questions could be used to allow the candidate to cover gaps.

Outcome 4 PC (a – e) Practical exercise and structured questions
The candidate will be presented with a practical exercise to test practical competence in carrying out conservation work.

Satisfactory performance will be demonstrated by the candidate meeting the performance criteria and evidence requirements including compliance with a predetermined specification for the work.

National Unit Specification: support notes (contd)

UNIT Conservation Masonry (Intermediate 2)

Where evidence of underpinning knowledge cannot be inferred from the candidate's performance in the practical exercise, structured questions could be used to allow the candidate to cover gaps.

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).