



Higher National Unit specification

General information for centres

Unit title: Health and Safety: Safety Technology

Unit code: F0NB 35

Unit purpose: This Unit is designed to enable the candidate to develop knowledge and understanding of the hazards, control of risks and legal requirements associated with workplace and work equipment.

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

- 1 Explain the main principles of the selection and use of work equipment.
- 2 Explain the hazards, risks and controls associated with machinery.
- 3 Explain the hazards, risks and controls associated with mechanical handling.
- 4 Explain failure modes and failure prevention strategies.
- 5 Describe and demonstrate understanding of the safe use of electricity in the workplace.
- 6 Describe the components of a pressure system and the causes and prevention of failure in these systems.

Credit points and level: 1.5 HN Credits at SCQF level 8: (12 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: Candidates should have the knowledge, skills and/or experience equivalent to SVQ level 3 in occupational health and safety practice. A minimum level of Core Skills at SCQF level 5 or equivalent is essential in Communication and Numeracy.

Core Skills: There is no automatic certification of Core Skills in this Unit. However, there may be opportunities to develop aspects of Core Skills in *Communication* and *Problem Solving*.

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: Two instruments of assessment will be used for this Unit. Restricted response questions will be used to assess Outcomes 2-5. These could be set as a single assessment event at the end of the Unit. Open-book restricted word count assignments are used to assess Outcomes 1 and 6.

Higher National Unit specification: statement of standards

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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

Explain the main principles of the selection and use of work equipment

Knowledge and/or Skills

- ◆ Process for the selection of suitable work equipment
- ◆ Process for ensuring safe use of work equipment
- ◆ Duties of manufacturers and suppliers in relation to health and safety
- ◆ Maintenance strategies
- ◆ Hazards, risks and controls for maintenance work
- ◆ Identify the statutory examinations required for work equipment

Evidence Requirements

To achieve the Outcome the candidate should produce evidence in an appropriate medium to demonstrate all aspects of the Knowledge and/or Skills section.

The candidate should produce accurate responses demonstrating understanding of the principles of the selection, use and maintenance of work equipment.

Assessment Guidelines

The candidate could be assessed by a 1 x 2,000 word assignment unsupervised. Candidates could be required to prepare an assignment describing the process of obtaining and using a new piece of work equipment for their work environment, the relevant maintenance strategies and statutory requirements. The piece of work should be relevant to all the knowledge criteria above and the assignment must include evidence from all sections. The candidate should be provided in advance with an assignment brief detailing the requirements and giving guidelines on structure and content.

Higher National Unit specification: statement of standards (cont)

Unit title: Health and Safety: Safety Technology

Outcome 2

Explain the hazards, risks and controls associated with machinery

Knowledge and/or Skills

- ◆ Necessary steps for a risk assessment on machinery
- ◆ European Standards relevant to machinery
- ◆ Hazards, risks and controls associated with Programmable Electronic Systems (PES)

Evidence Requirements

To achieve the Outcome the candidate should produce evidence in an appropriate medium to demonstrate all aspects of the Knowledge and/or Skills section.

The candidate should produce accurate responses demonstrating understanding of the hazards, risks and controls associated with machinery.

Assessment Guidelines

The candidate could be assessed by a restricted response questions completed under supervised, controlled conditions. The questions will examine the candidates understanding of the hazards, risks and controls associated with machinery and PES and European Standards.

Outcome 3

Explain the hazards, risks and controls associated with mechanical handling equipment

Knowledge and/or skills

- ◆ Hazards and ways of reducing risk in relation to:
 - manual lifting equipment
 - mechanical and automated lifting equipment
- ◆ Statutory requirements

Evidence Requirements

Candidates should produce accurate responses in an appropriate medium to demonstrate their understanding of the hazards, risks and controls associated with mechanical handling equipment.

Assessment Guidelines

The candidate could be assessed by a restricted response question paper completed under supervised, controlled conditions. To achieve the Outcome each candidate should produce evidence from a selection of the equipment listed to demonstrate an understanding of the Knowledge and/or Skills section. The paper should examine the candidate's understanding of the hazards, risks and controls associated with mechanical handling.

Higher National Unit specification: statement of standards (cont)

Unit title: Health and Safety: Safety Technology

Outcome 4

Describe failure modes and failure prevention strategies

Knowledge and/or Skills

- ◆ Failure modes
- ◆ Causes of these failure modes and failure prevention strategies
- ◆ Non-destructive testing techniques

Evidence Requirements

To achieve the Outcome each candidate should produce evidence in an appropriate medium to demonstrate an understanding of each part of the Knowledge and/or Skills section.

Candidates should produce accurate responses to demonstrate their understanding of failure modes and failure prevention strategies and be able to relate these to major incidents. They should also be able to describe the use of non-destructive testing techniques in terms of advantages and disadvantages.

Assessment Guidelines

The candidate could be assessed by a restricted response questions completed under supervised, controlled examination conditions. The paper should examine the candidate's understanding of failure modes and prevention strategies in relation to major incidents.

Outcome 5

Describe and demonstrate understanding of safe working with electricity in the workplace

Knowledge and/or Skills

- ◆ Basic principles
- ◆ Common hazards
- ◆ Risk assessment of electrical operations
- ◆ Safe use and maintenance of electrical equipment and systems
- ◆ Statutory requirements

Evidence Requirements

To achieve the Outcome each candidate should produce evidence in an appropriate medium to demonstrate an understanding of each part of the Knowledge and/or Skills section. The candidate will be required to produce accurate written responses to demonstrate understanding of the safe use of electricity in the workplace.

Higher National Unit specification: statement of standards (cont)

Unit title: Health and Safety: Safety Technology

Assessment guidelines

The candidate could be assessed by restricted response questions completed under supervised, controlled examination conditions. The paper will examine the candidate's understanding of the safe use of electricity in the workplace.

Outcome 6

Describe the components of a pressure system and the causes and prevention of failure in these systems

Knowledge and/or Skills

- ◆ Components of a pressure system.
- ◆ Causes of failure in the system.
- ◆ Failure prevention in pressure systems
- ◆ Statutory requirements

Evidence Requirements

To achieve the Outcome each candidate should produce evidence in an appropriate medium demonstrating knowledge and understanding of all aspects of the Knowledge and/or Skills section.

Candidates should produce accurate responses to demonstrate their understanding of failure modes and failure prevention strategies.

Assessment Guidelines

The candidate could be assessed by 1 x 1,000 word assignment unsupervised. Each candidate will be required to prepare an assignment describing a pressure system in their workplace, identifying possible failures, control measures and legal requirements relevant to the system. The candidate should be provided in advance with an assignment brief detailing the requirements and giving guidelines on structure and content.

Administrative Information

Unit code: F0NB 35

Unit title: Health and Safety: Safety Technology

Superclass category: PL

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Version	Description of change	Date

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Higher National Unit specification: support notes

Unit title: Health and Safety: Safety Technology

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 60 hours.

Guidance on the content and context for this Unit

The Unit forms part of the Professional Development Award in Occupational Health and Safety Practice, and may be delivered as part of this or similar SCQF Level 8 Group Award. It is designed to meet ENTO occupational standards at level 4, and is a likely qualification route for full-time professional occupational safety and health professionals aspiring to Membership of professional institutions.

This Unit is designed to provide candidates with the knowledge and understanding of occupational health risks and associated control/monitoring measures and strategies.

The following areas should be covered:

Outcome 1

The process for the selection of suitable work equipment:

- ◆ suitability
- ◆ conformity
- ◆ competence employees

The process for ensuring safe use of work equipment:

- ◆ risk assessment
- ◆ risk control

The duties of manufacturers and suppliers:

- ◆ risk assessment
- ◆ essential health and safety requirements
- ◆ declaration of conformity
- ◆ CE marking

Suitable maintenance strategies and describe the hazards, risks and controls for maintenance work:

- ◆ hazards
- ◆ controls
- ◆ maintenance strategies

Higher National Unit specification: support notes (cont)

Unit title: Health and Safety: Safety Technology

The statutory examinations required by work equipment:

- ◆ purpose and nature
- ◆ competent persons
- ◆ notification
- ◆ records
- ◆ types

Outcome 2

The necessary steps for a risk assessment on machinery:

- ◆ machinery hazards
- ◆ risk factors
- ◆ safeguards
- ◆ safe systems of work

The European Standards relevant to machinery:

- ◆ BS EN ISO 12100
- ◆ BS EN ISO 14121
- ◆ Type A, B and C standards

The hazards, risks and controls associated with Programmable Electronic Systems (PES):

- ◆ description PES
- ◆ description of hazards
- ◆ risk control in use, programming and maintenance

Outcome 3

The hazards and ways of reducing risk in relation to:

- ◆ lift trucks
- ◆ cranes
- ◆ hoists
- ◆ conveyors
- ◆ automated lifting equipment
- ◆ agricultural machinery

Statutory requirements:

- ◆ Lifting Operations and Lifting Equipment Regulations
- ◆ Provision and Use of Work Equipment Regulations
- ◆ Supply of Machinery (Safety) Regulations

Higher National Unit specification: support notes (cont)

Unit title: Health and Safety: Safety Technology

Outcome 4

Failure modes:

- ◆ ductile
- ◆ brittle failure
- ◆ metal fatigue
- ◆ buckling
- ◆ corrosion
- ◆ wear
- ◆ creep

The causes of these failure modes and failure prevention strategies and relate to major incidents:

- ◆ identifying potential failures
- ◆ environmental factors
- ◆ safety factors
- ◆ testing
- ◆ examination failed components
- ◆ failure modes and prevention related to major disasters

Non-destructing testing techniques in terms of advantages and disadvantages:

- ◆ visual inspection
- ◆ liquid penetrant inspection
- ◆ magnetic particle inspection
- ◆ eddy current testing
- ◆ radiography
- ◆ ultrasonic testing

Outcome 5

The safe use of electricity in the workplace:

- ◆ basic principles: potential difference, current, resistance, impedance, Ohm's Law, earthing, direct and alternating current
- ◆ dangers: electric shock, electrical burns, fire, arcing

Risk assessment of electrical operations:

- ◆ portable electrical equipment
- ◆ static electricity
- ◆ planning, design and installation of electrical systems
- ◆ adverse or hazardous environments
- ◆ safe use, maintenance and repair of electrical systems
- ◆ high voltage systems
- ◆ legal requirements: Electricity at Work Regulations 1989, Dangerous Substances and Explosive Atmospheres Regulations 2002

Higher National Unit specification: support notes (cont)

Unit title: Health and Safety: Safety Technology

Safe use and maintenance of electrical equipment and systems:

- ◆ portable electrical equipment
- ◆ static electricity
- ◆ Planning, design and installation of electrical systems
- ◆ Adverse or hazardous environments
- ◆ Safe use, maintenance and repair of electrical systems
- ◆ High voltage systems
- ◆ Legal requirements: Electricity at Work Regulations 1989, Dangerous Substances and Explosive Atmospheres Regulations 2002

Outcome 6

The components of a pressure system:

- ◆ pressure vessel
- ◆ associated pipework
- ◆ protective devices
- ◆ relevant fluids

The causes of failure in the system:

- ◆ excessive stress
- ◆ abnormal external loading
- ◆ overpressure
- ◆ overheating
- ◆ mechanical fatigue and shock
- ◆ thermal fatigue and shock
- ◆ brittle fracture
- ◆ creep
- ◆ hydrogen attack
- ◆ corrosive failure
- ◆ contributory factors

Procedures to prevent failure of the pressure systems and meet legal requirements:

- ◆ design and construction
- ◆ repair and modification
- ◆ information and marking
- ◆ written scheme of examination
- ◆ maintenance and record keeping
- ◆ competent persons

Higher National Unit specification: support notes (cont)

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Guidance on the delivery and assessment of this Unit

Assessments for Outcome 2, 3, 4 and 5 could be set at the end of the Unit.

Assessments for Outcomes 1 and 6 can only be set once the material has been covered.

It would be beneficial to deliver the Outcomes in sequence.

BIBLIOGRAPHY

NEBOSH Level 4 Diploma in Occupational Health and Safety Practice Unit C — Managing Health and Safety — RRC Business Training 2003.

John Ridley and Dick Pearce, *Safety with Machinery* (2nd edition), (2006) Elsevier, Oxford.

Electricity at Work Regulations

Dangerous Substances and Explosive Atmospheres Regulations

Workplace (Health, Safety and Welfare) Regulations

Provision and Use of Work Equipment Regulations

Lifting Operations and Lifting Equipment Regulations

Supply of Machinery (Safety) Regulations

Pressure Systems Safety Regulations

Opportunities for developing Core Skills

There are opportunities to develop aspects of the Core Skills in *Communication* (written and oral) and *Problems Solving* (evaluating) through the assessments for this Unit.

Open learning

Open learning implies that, while candidates study out with the centres using materials provided, it would be necessary to attend the centre for workshops and assessments. For further information on Open and Distance Learning, please refer to the SQA publication, *Assessment and Quality Assurance of Open and Distance Learning (SQA 2000)*.

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: Health and Safety: Safety Technology

This Unit concentrates on the development of knowledge and understanding of the hazards, control of risks and legal requirements associated with workplace and work equipment. The Unit covers work equipment, machinery, mechanical handling equipment, pressure vessels, different failure modes, electricity in the work place and maintenance requirements. It is divided into six sections:

- 1 Main principles of the selection and use of work equipment.
- 2 Hazards, risks and controls associated with machinery.
- 3 Hazards, risks and controls associated with mechanical handling.
- 4 Failure modes and failure prevention strategies.
- 5 Safe use of electricity in the workplace.
- 6 Components of pressure systems and the causes and prevention of failure in these systems.

To be awarded the Unit, you need to achieve six Outcomes, which correspond to the sections listed above.

Achievement of Outcomes 2, 3, 4 and 5 could be assessed using restricted response questions under examination conditions. These may be grouped as a single assessment event at the end of the Unit.

Outcomes 1 and 6 could be assessed by unsupervised assignments, set at the time the Outcomes are completed. For each of these you will receive in advance a briefing from your tutor and a briefing paper detailing the requirements and giving guidelines on structure and content.

On completion of the Unit you should be able to advise an organisation on suitable management systems for workplace equipment and machinery.