



Design and Manufacture: Materials and Manufacturing (National 4)

SCQF: level 4 (9 SCQF credit points)

Unit code: H22V 74

Unit outline

The general aim of this Unit is to develop the learner's skills and creativity in manufacturing a product or prototype based on a given design concept. The aim includes developing an appreciation and application of the properties and uses of materials.

Learners will manufacture models and prototypes, applying a range of practical skills. The Unit is designed to enable the learner to develop knowledge of the impact of materials and manufacturing on design and the environment.

Learners who complete this Unit will be able to:

- 1 Plan the manufacture of a prototype
- 2 Manufacture and review a prototype
- 3 Identify the key aspects of commercial manufacture

This Unit is a mandatory Unit of the National 4 Design and Manufacture Course and is also available as a free-standing Unit. The Unit Specification should be read in conjunction with the *Unit Support Notes*, which provide advice and guidance on delivery, assessment approaches and development of skills for learning, skills for life and skills for work. Exemplification of the standards in this Unit is given *in Unit Assessment Support*.

The *Added Value Unit Specification* for the National 4 Design and Manufacture Course gives further mandatory information on Course coverage for learners taking this Unit as part of the National 4 Design and Manufacture Course.

Recommended entry

Entry to this Unit is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- ◆ National 3 Design and Technology Course or relevant component Units

In terms of prior learning and experience, relevant experiences and outcomes may also provide an appropriate basis for doing this Unit.

Equality and inclusion

This Unit Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information, please refer to the *Unit Support Notes*.

Standards

Outcomes and assessment standards

Outcome 1

The learner will:

Plan the manufacture of a prototype by:

- 1.1 Selecting and justifying materials to suit manufacturing tasks
- 1.2 Selecting suitable tools and equipment for manufacturing tasks
- 1.3 Producing a sequence of operations

Outcome 2

The learner will:

Manufacture and review a prototype by:

- 2.1 Preparing and marking materials for component parts
- 2.2 Cutting, shaping and finishing component parts
- 2.3 Assembling and joining component parts
- 2.4 Finishing assembled prototype
- 2.5 Testing the prototype

Outcome 3

The learner will:

Identify the key aspects of commercial manufacture by:

- 3.1 Selecting suitable materials for commercial manufacture
- 3.2 Selecting suitable processes for commercial manufacture
- 3.3 Identifying ways in which design and manufacturing technologies impact on the environment

Evidence Requirements for the Unit

Assessors should use their professional judgement, subject knowledge and experience, and understanding of their learners, to determine the most appropriate ways to generate evidence and the conditions and contexts in which they are used.

Evidence may be a combination of written, oral, graphic and practical evidence. Evidence may be presented for individual Outcomes or it may be gathered for the Unit as a whole through combining assessment holistically in one single activity. If the latter approach is used, it must be clear how the evidence covers each Outcome.

For this Unit, learners will be required to provide evidence of:

- ◆ knowledge and understanding of manufacturing processes and materials
- ◆ practical skills in preparing for and carrying out manufacturing tasks in a workshop context
- ◆ awareness of recognised workshop procedures and safe working practices

For each of the Outcomes in this Unit, the materials that learners will investigate, test and use will generally be from the categories of timber, metals and plastics. Generally, the materials that will be used in manufacturing will be timbers, metals and plastics in their common forms, however where required, other materials may be used.

Prototypes for Outcome 3 must be manufactured from at least two different materials. These can be materials from the different material categories or from within one of them.

Exemplification of assessment is provided in *Unit Assessment Support*. Advice and guidance on possible approaches to assessment is provided in the *Unit Support Notes*.

Assessment standard thresholds

If a candidate successfully meets the requirements of the specified number of Assessment Standards they will be judged to have passed the Unit overall and no further re-assessment will be required.

The specific requirements for this Unit is as follows:

- ◆ 8 out of 11 Assessment Standards must be achieved.

It should be noted that there will still be the requirement for candidates to be given the opportunity to meet all Assessment Standards. The above threshold has been put in place to reduce the volume of re-assessment where that is required.

Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Unit. The skills that learners will be expected to improve on and develop through the Unit are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Unit where there are appropriate opportunities.

2 Numeracy

2.2 Money, time and measurement

4 Employability, enterprise and citizenship

4.4 Enterprise

5 Thinking skills

5.1 Remembering

5.2 Understanding

5.3 Applying

Amplification of these is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work*. The level of these skills should be at the same SCQF level of the Unit and be consistent with the SCQF level descriptor. Further information on building in skills for learning, skills for life and skills for work is given in the *Unit Support Notes*.

Administrative information

Published: September 2018 (version 2.1)

Superclass: WB

History of changes to National Unit Specification

Version	Description of change	Authorised by	Date
1.1	Assessment Standard 3.2 — 'which are' text added; Assessment Standard 3.5 — 'prototypes' now 'prototype',	Qualifications Development Manager	June 2013
2.0	All Outcomes and Assessment Standards completely revised.	Qualifications Manager	April 2015
2.1	Assessment standard thresholds added.	Qualifications Manager	Sep 2018

This specification may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged. Additional copies of this Unit can be downloaded from SQA's website at www.sqa.org.uk.

Note: readers are advised to check SQA's website: www.sqa.org.uk to ensure they are using the most up-to-date version of the Unit Specification.

© Scottish Qualifications Authority 2018