

# Comparative document

(Version 1.1 June 2013 compared with Version 1.2 June 2014)

## National 5 Practical Metalworking Course Assessment Specification (C761 75)

The purpose of this document is to give a quick, visual guide to any amendments or clarifications made during the revision process.

**Valid from August 2013**

First edition: April 2012

Revised: June ~~2013~~2014, version 1.42

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Please refer to the note of changes at the end of this Course Assessment Specification for details of changes from previous version (where applicable).

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# Assessment

To gain the award of the Course, the learner must pass all of the Units as well as the Course assessment. Course assessment will provide the basis for grading attainment in the Course award.

## Course assessment

SQA will produce and give instructions for the production and conduct of Course assessments based on the information provided in this document.

## Added value

The purpose of the Course assessment is to assess added value of the Course as well as confirming attainment in the Course and providing a grade. The added value for the Course will address the key purposes and aims of the Course, as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge, or application.

In this Course assessment, added value will focus on the following:

- ◆ challenge — requiring greater depth or extension of knowledge and/or skills
- ◆ application — requiring application of knowledge and/or skills in practical or theoretical contexts as appropriate

This added value consists of:

- ◆ applying skills, knowledge and understanding developed through the Course to manufacture a finished product in metal to a given standard
- ◆ demonstrating practical creativity and problem-solving during the manufacturing process

## Grading

Course assessment will provide the basis for grading attainment in the Course award.

The Course assessment is graded A–D. The grade is determined on the basis of the total mark for all Course assessments together.

A learner's overall grade will be determined by their performance across the Course assessment.

### Grade description for C

For the award of Grade C, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners will typically have demonstrated successful performance in relation to the mandatory skills, knowledge and understanding for the Course.

**Grade description for A**

For the award of Grade A, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners will typically have demonstrated a consistently high level of performance in relation to the mandatory skills, knowledge and understanding for the Course.

**Credit**

To take account of the extended range of learning and teaching approaches, remediation, consolidation of learning and integration needed for preparation for external assessment, six SCQF credit points are available in Courses at National 5 and Higher, and eight SCQF credit points in Courses at Advanced Higher. These points will be awarded when a grade D or better is achieved.

## Structure and coverage of the Course assessment

The Course assessment will consist of one Component: a practical activity.

### Component 1 — practical activity

The purpose of the practical activity is to allow learners to demonstrate the application of skills and knowledge that they have developed during the Course to produce a finished product to a given standard in metal.

The practical activity will comprise 100% of the overall marks for Course assessment. It should be carried out under workshop conditions.

The working drawings for the practical activity will not detail every aspect of the product. This will allow the task to be sufficiently open and flexible to allow for personalisation and choice, and will allow learners to demonstrate practical creativity.

This practical activity will give learners an opportunity to demonstrate the following skills, knowledge and understanding:

- ◆ selecting and using a range of common metalworking tools, equipment and materials appropriate for activity
- ◆ reading, interpreting and following given working drawings and outline specification information and cutting lists
- ◆ marking out, cutting and shaping metalwork components
- ◆ fabricating and joining metalwork components
- ◆ manufacturing a finished product to given drawings and standards
- ◆ working and using tools and equipment in accordance with recognised procedures and safe working practices

The product will be made using a minimum of five component parts. In totality, the component parts will require learners to use skills and apply knowledge gained from across the Course, related to bench skills, machine processes, fabrication and joining. The assembly, fitting, fixing of the components to form the completed product may also require the application of skills from across the Course.

The use of at least one thermal joining technique is mandatory in the product.

It is assumed the completed product will be easily portable. The standards and tolerances applicable to the product are as follows:

Operation	Tolerance
Individual components	
Marking out	±0.5mm
Fitting work	±0.5mm
Sheet metal work (cutting)	±1mm
Bending work — sheet metal	±2mm
Bending work — metal strip/bar	±5mm
Forge processes (twisting, drawing down and flattening)	±3mm
Assembly, joining and fitting	
Functional sizes	±1mm 0.5mm linear
Thermal joining	Minimum length of 20mm consistent in width

Pedestal drill	
Drilling and countersinking	±0.5mm
Centre lathe	
Parallel turning, facing and chamfering	±0.5mm linear ±0.2mm diameter

### Functional dimension

Any size on a component part that **must** be within tolerance or the product will not function or assemble properly. This is particularly important for moving parts.

In addition, evidence is required to show that:

- ◆ Each component part has been marked out in accordance with the working drawings and demonstrates four functional dimensions within specified tolerances
- ◆ The thermal joining within the manufacture of the product is reasonably consistent in quality and form (the minimum joint length requirement being 20mm and consistency relating to width of the joint).
- ◆ The cutting, shaping, forming and fitting of metal components (using sections and sheet materials) conform to the requirements of the working drawings.
- ◆ Overall, the product is assembled, joined and fitted in accordance with the working drawings and demonstrates ~~six~~four functional dimensions are within specified tolerance.
- ◆ Drilling and countersinking operations (using a pedestal drill) have been carried out within specified tolerance
- ◆ Parallel turning, facing and chamfering operations on a centre lathe have been carried out with neatness and consistency of finish within specified tolerance
- ◆ Surfaces have been well-prepared and finished to a high standard

During the practical activity, learners must follow recognised procedures and safe working practices at all times.

A record of progress of the practical activity (such as an informal log or blog) should be produced and kept by the learner. Information in the diary should include when tasks are completed, areas that have been an issue for the learner, safe working practices, and strength and weaknesses. The diary should also indicate where practical creativity has been demonstrated.

For further details of the Course requirements, please see the 'Further mandatory information on Course coverage' section.

## **Setting, conducting and marking of assessment**

### **Controlled assessment — practical activity**

This practical activity is:

- ◆ set by SQA
- ◆ conducted under some supervision and control

Evidence will be internally marked by centre staff in line with SQA marking instructions.

All marking will be quality assured by SQA.

#### **Setting the assessment**

Set by SQA.

#### **Conducting the assessment**

Conducted under some supervision and control.

A bank of practical activities will be provided and there will be a choice from the bank.

The practical activity will be carried out under supervised conditions, to ensure that the work presented is the learner's own work.

The assessor may also give learners support and guidance to help them progress through each stage of the practical activity; where a significant amount of support is provided, this should be reflected in the marks awarded.

While the learner may be provided with feedback to help them achieve the next stage of the assessment, they are not allowed to be re-assessed on stages already completed.

## Further mandatory information on Course coverage

The following gives details of mandatory skills, knowledge and understanding for the National 5 Practical Metalworking Course. Course assessment will involve sampling the skills, knowledge and understanding. This list of skills, knowledge and understanding also provides the basis for the assessment of Units of the Course. When preparing learners for the Course assessment, please refer first to the 'Structure and coverage of the Course assessment' section.

<b>Identification and skills in use of the following, including associated processes, as appropriate:</b>	
<b>Measuring and marking out</b>	<p>Tools and equipment:</p> <ul style="list-style-type: none"> <li>◆ scribe and scribing block</li> <li>◆ steel rule</li> <li>◆ combination set</li> <li>◆ engineer's square</li> <li>◆ centre finder</li> <li>◆ spring dividers</li> <li>◆ calipers (oddleg, inside, outside, and Vernier or digital)</li> <li>◆ micrometer (analogue or digital)</li> <li>◆ centre punch</li> <li>◆ witness marks</li> <li>◆ surface table</li> <li>◆ angle block</li> <li>◆ v-block</li> </ul> <p>Knowledge and understanding of:</p> <ul style="list-style-type: none"> <li>◆ units of measurement: datum, functional dimensions</li> <li>◆ engineer's blue</li> <li>◆ allowances for expansion, bending, stretching, forming, trimming, welding, brazing and soldering</li> </ul>
<b>Reading and interpreting drawings and documents</b>	<p>Working drawings, pictorial drawings, diagrams, cutting lists.</p> <p>Knowledge and understanding of orthographic projection, scale, dimensioning (linear, radial and diameter) and basic drawing conventions including: line types, centre lines and hidden detail.</p>
<b>Materials</b>	<p>Knowledge of a variety of common metalworking materials:</p> <ul style="list-style-type: none"> <li>◆ ferrous metals (steel, high carbon steel, iron)</li> <li>◆ non-ferrous metals (aluminium, copper, nickel)</li> <li>◆ alloys (bronze, brass, stainless steel)</li> <li>◆ common sections (square bar, round bar, hexagonal bar, angle iron, tube)</li> <li>◆ sheet materials (tin plate, copper, brass, steel, aluminium)</li> </ul> <p>Common metals associated with different fabrication and joining techniques</p>
<b>Bench work</b>	<p>Common bench tools, including:</p>

	<ul style="list-style-type: none"> <li>◆ hammers (ball-pein)</li> <li>◆ cold chisels</li> <li>◆ files</li> <li>◆ saws</li> <li>◆ taps, dies, tap wrench and die stock for tapping and threading and awareness of twist drill size</li> <li>◆ rivet set and snap</li> </ul>
<b>Sheet metal tools and machines</b>	<ul style="list-style-type: none"> <li>◆ bending equipment including folding bars</li> <li>◆ notchers</li> <li>◆ hide or rubber mallets</li> <li>◆ tin snips</li> <li>◆ pop riveter</li> <li>◆ spot welder</li> <li>◆ formers and jigs (as appropriate)</li> </ul>
<b>Machine processes</b>	<p>Centre lathe: parallel turning, taper turning (using a compound slide), facing, chamfering, centre drilling and drilling generally, knurling, parting off, use of a 4-jaw chuck (if appropriate)</p> <p>Pedestal drill for drilling and countersinking</p> <p>Knowledge of:</p> <ul style="list-style-type: none"> <li>◆ bench grinders</li> <li>◆ centring of cutting tools</li> <li>◆ milling machines (vertical, horizontal and CNC)</li> <li>◆ industrial cutting processes (including laser and plasma cutters)</li> </ul>
<b>Machine tools</b>	<ul style="list-style-type: none"> <li>◆ lathe cutting tools</li> <li>◆ knurling tool</li> <li>◆ parting tool</li> <li>◆ 3-jaw chuck, 4-jaw chuck, Jacob's chuck</li> <li>◆ chuck keys</li> <li>◆ revolving centres</li> <li>◆ machine vices</li> </ul> <p>appropriate holding devices</p> <p>safety equipment</p>
<b>Finishing</b>	<p>Preparation of surfaces</p> <p>Planishing, polishing, bluing</p> <p>Machine finishing (ground, milled)</p> <p>Knowledge (but not use) of preparation and application of painting and <a href="#">bluepowder</a>-dip coating</p>
<b>Care and maintenance of tools and equipment</b>	<p>Knowledge and understanding of:</p> <ul style="list-style-type: none"> <li>◆ reporting faults and fault reporting systems</li> <li>◆ general condition before, during and after use</li> <li>◆ position and condition of guards</li> </ul>

	<ul style="list-style-type: none"> <li>◆ position and security of cutting tools on machine tools</li> <li>◆ secure holding techniques</li> </ul>
<b>Fabrication and thermal Joining</b>	<p>Hot-forming techniques including twisting, drawing down and flattening</p> <p>Hot-bending techniques including metal bar bending and metal strip bending</p> <p>Thermal joining techniques including welding, soldering or brazing</p> <p>Mechanical fixing techniques including riveting, screw-fixing and proprietary fixings</p> <p>Proprietary metalwork adhesives</p> <p>Heat-treatment methods of annealing, hardening and Tempering</p> <p>Knowledge and understanding of metals associated with different fabrication and joining techniques</p> <p>Knowledge of industrial welding techniques</p>
<b>Safe working practices</b>	<p>Good practices and safe systems for general workshop and individual activities as appropriate</p> <p>Personal Protective Equipment</p>
<b>Sustainability and recycling</b>	<p>Best practice in selecting materials appropriate for use</p> <p>Understanding and following workshop recycling practices and processes</p>

# Administrative information

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Published: June ~~2013~~2014 (version 1.~~1~~2)

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## History of changes to Course Assessment Specification

Course details	Version	Description of change	Authorised by	Date
	1.1	Marks changed from 100 to 80; further information and clarification on scope and structure of the practical activity given in the 'Structure and coverage of Course assessment' section; Further mandatory information' section restructured and further information added	Qualifications Development Manager	June 2013
	<a href="#">1.2</a>	<a href="#">Structure and coverage of the course assessment section:</a> <a href="#">Amend functional sizes p.5</a> <a href="#">Additional information p.5</a> <a href="#">Amended information p.6</a> <a href="#">Amended information p.9</a>	<a href="#">Qualifications Manager</a>	<a href="#">June 2014</a>

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