



National
Qualifications

Practical Metalworking

Practical activity

General assessment information

This pack contains general assessment information for centres preparing candidates for the practical activity Component of National 5 Practical Metalworking Course assessment.

It must be read in conjunction with the specific assessment task(s) for this Component of Course assessment, which may only be downloaded from SQA's designated secure website by authorised personnel.

Valid from session 2013/14 and until further notice

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Introduction

This is the general assessment information for the National 5 Practical Metalworking practical activity.

This practical activity is worth 80 marks. This is 100% of the overall marks for the Course assessment. The Course will be graded A-D.

The Course assessment has no other Components.

This document describes the general requirements for the assessment of the practical activity Component for this Course. It gives general information and instructions for assessors.

It must be read in conjunction with the assessment task for this Component of Course assessment.

The assessment task will be set and externally verified by SQA, and conducted, marked and internally verified in centres under conditions specified by SQA.

Equality and inclusion

This Course assessment has been designed to ensure that there are no unnecessary barriers to assessment. Assessments have been designed to promote equal opportunities while maintaining the integrity of the qualification.

For guidance on assessment arrangements for disabled candidates and/or those with additional support needs, please follow the link to the assessment arrangements web page: www.sqa.org.uk/sqa/14977.html

Guidance on inclusive approaches to delivery and assessment in this Course is provided in the *Course Support Notes*.

What this assessment covers

This assessment contributes 100% of the total marks for the Course.

The assessment will assess the skills, knowledge and understanding specified for the practical activity in the *Course Assessment Specification*. These are:

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

Assessment

Purpose

The purpose of this assessment is to generate evidence for the added value of this Course by means of a **practical activity**.

Assessment overview

The practical activity is a meaningful and appropriately challenging task which allows candidates to demonstrate practical application of skills and knowledge at an appropriate level from all the three Units of the Course – *Bench Skills*, *Machine Processes* and *Fabrication and Thermal Joining* – to produce a finished product to a given standard in metal (as defined in the ‘Further mandatory information on Course coverage’ section of the *Course Assessment Specification*).

The practical activity is designed to allow candidates to demonstrate their ability to work safely and independently.

The product will be made using a minimum of five component parts. The components will be assembled, fitted and fixed and an appropriate finish applied to a given standard. Candidates will be required to provide evidence of using bench skills, machine processes skills and fabrication and joining techniques in the manufacture of the product.

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

In addition, evidence is required of the following:

- ◆ Each component part must be marked out in accordance with the working drawings and within specified tolerances.
- ◆ The thermal joining within the manufacture of the product must be reasonably consistent in quality and form; the minimum length requirement for this work is 20mm, along with consistency in width of the joint.
- ◆ Cutting, shaping, forming and fitting metal components using sections and sheet materials to conform to the working drawings.
- ◆ The overall product must be assembled, joined and fitted in accordance with the working drawings, with functional sizes within specified tolerance.
- ◆ Performing drilling and countersinking operations on a pedestal drill within specified tolerance.
- ◆ Performing parallel turning, facing and chamfering operations on a centre lathe with neatness and consistency of finish within specified tolerance.
- ◆ Finish – well prepared surfaces finished to a high standard.

The following standards and tolerances apply to practical activities:

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	± 1.0mm 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

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 candidates to demonstrate practical creativity.

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

The practical activity is set by SQA. A bank of practical activities will be provided and centres may select from the bank.

The practical activity will be internally marked by centre staff, in line with the marking instructions provided in this document.

Full instructions for candidates are contained within each assessment task.

In addition to completing the practical activity, candidates are required to complete a record of progress, noting when tasks are completed, areas that have been an issue for them, safe working practices, and strengths and weaknesses. The record should also indicate where practical creativity has been demonstrated. The record may be used to support assessment judgements.

Assessment conditions

Assessors must exercise their professional responsibility in ensuring that evidence submitted by a candidate is the candidate's own work.

- ◆ The practical activity will be carried out under some supervision and control.
- ◆ The assessor must ensure that the work presented for assessment purposes is the candidate's own work.
- ◆ The candidate should work independently throughout the practical activity.
- ◆ An assessor may give candidates feedback/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.
- ◆ Re-assessment of completed stages in the production of the product is not allowed.

Candidates must undertake the assessment independently. However, reasonable assistance may be provided prior to the formal assessment process taking place.

The term 'reasonable assistance' is used to try to balance the need for support with the need to avoid giving too much assistance. If any candidate requires more than what is deemed to be 'reasonable assistance', they may not be ready for assessment or it may be that they have been entered for the wrong level of qualification.

Reasonable assistance may be given on a generic basis to a class, a group of candidates, or on an individual basis. When reasonable assistance is given on a one-to-one basis in the context of something the candidate has already produced or demonstrated, there is a danger that it becomes support for assessment; assessors need to be aware that this may be going beyond reasonable assistance.

Clarification may be sought by candidates regarding the specification of a working drawing or instructions for the assessment task if they find them unclear. In this case, the clarification should normally be given to the whole class.

Some guidance may be provided during preparation stages for the practical activity, but the candidate should work independently throughout the main activities. Any assistance provided must be recorded so that the candidate's own work may be judged fairly.

As this practical activity is a summative assessment, support and guidance during all stages should be limited to minimal prompts and questioning, referring the candidate to the instructions provided in the assessment task.

Assessors should put in place mechanisms to authenticate candidates' evidence. For example:

- ◆ regular checkpoint/progress meetings with candidates
- ◆ short spot-check personal interviews
- ◆ checklists which record activity/progress
- ◆ photographs, film or audio evidence

Once the practical activity has been completed and submitted, it should not be returned to the candidate for further work to improve their mark.

Evidence to be gathered

The following candidate evidence is required for this assessment:

- ◆ the completed product
- ◆ the record of progress through the task – evidence in hard copy (paper-based) or readily accessible electronic format
- ◆ any jigs or templates created by the candidate and used in the manufacture of the product
- ◆ completed cutting list – evidence in hard copy (paper-based) or readily accessible electronic format
- ◆ evidence of skills and processes demonstrated during manufacture of product that cannot be readily judged on the basis of the completed product – eg paper-based photographs and/or detailed assessor observation notes

This evidence must be retained for quality assurance purposes.

General Marking Instructions

Marks for internally assessed Components must be submitted to SQA by your centre. Evidence for this assessment should be retained in the centre for SQA quality assurance purposes. Further information on this will be provided by SQA.

Marking for all practical activities has been divided into four sections:

Marks will be awarded for:

- ◆ reading from working drawings, marking out, cutting and shaping components appropriately, using correct tools and equipment
- ◆ assembly
- ◆ quality of manufacturing
- ◆ surface finishing

Assessors should allocate a mark out of 20 for each of the four sections, by following the instructions given below. This mark should be recorded on the candidate's assessment record, with a comment justifying why each mark was awarded.

For each of the sections, the marker should select the band descriptor which most closely describes the evidence presented.

Once the best fit has been decided, then:

- ◆ where the evidence almost matches the level above, the highest available mark from the range should be awarded
- ◆ where the candidate's work just meets the standard described, the lowest mark from the range should be awarded
- ◆ otherwise an appropriate mark from the middle of the range should be awarded

Notes:

- ◆ where the evidence completely matches the highest level band descriptor for any section, and has been produced by the candidate working independently, 20 marks should be awarded for that section
- ◆ zero (0) marks should be awarded for any section where no evidence has been produced by the candidate

1. Reading from working drawings: marking out, cutting, and shaping component parts appropriately using correct tools and equipment

The assessment of this work will mostly take place as the product is produced. As such, it is recommended that assessors keep a note of any work which falls outside the stated tolerances; this will help in deciding a candidate's overall level of performance under this heading.

Appropriate evidence for some aspects might be through observation and activities documented in the record of progress.

Judging the evidence for:					
1. Reading from working drawings, marking out, cutting and shaping component parts appropriately, using correct tools and equipment					
	<p>All of the component parts meet the requirements of the working drawing.</p> <p>All of the component parts have been marked out, cut and shaped to within $\pm 1.0\text{mm}$.</p> <p>Candidate worked with due care and attention to safety during all of the marking, cutting and shaping activities</p> <p>Candidate worked independently during all of the marking, cutting and shaping activities – assistance was generally not required.</p>	<p>Almost all of the component parts meet the requirements of the working drawing.</p> <p>Almost all of the component parts have been marked out, cut and shaped to within $\pm 1.0\text{mm}$.</p> <p>Candidate worked with due care and attention to safety during almost all of the marking, cutting and shaping activities</p> <p>Candidate worked independently during almost all of the marking, cutting and shaping activities – a limited amount of assistance was required.</p>	<p>More than half of the component parts meet the requirements of the working drawing.</p> <p>More than half of the component parts have been marked out, cut and shaped to within $\pm 1.0\text{mm}$.</p> <p>Candidate worked with due care and attention to safety during more than half of the marking, cutting and shaping activities</p> <p>Candidate worked independently during most of the marking, cutting and shaping activities – occasional guidance was required.</p>	<p>Less than half of the component parts meet the requirements of the working drawing.</p> <p>Less than half of the component parts have been marked out, cut and shaped to within $\pm 1.0\text{mm}$.</p> <p>Candidate worked with due care and attention to safety during some of the marking, cutting and shaping activities</p> <p>Candidate worked independently during some of the marking, cutting and shaping activities – some guidance was required.</p>	<p>Few of the components meet the requirements of the working drawing.</p> <p>Few of the component parts have been marked out, cut and shaped to within $\pm 1.0\text{mm}$.</p> <p>Candidate worked with due care and attention to safety during a limited number of the marking, cutting and shaping activities.</p> <p>Candidate worked independently during a limited number of the marking, cutting and shaping activities – significant guidance was required.</p>
Mark range	17-20	13-16	9-12	5-8	0-4

2. Assembly

The completed product should be accurately assembled, with the overall tolerances being within the specified limits.

Judging the evidence for:					
2. Assembly					
	All of the assembly meets the dimensional requirements of the working drawing.	Almost all of the assembly meets the dimensional requirements of the working drawing.	More than half assembly meets the requirements of the working drawing.	Less than half of the assembly meets the requirements of the working drawing.	Little of the assembly meets the requirements of the working drawing.
	All specified functional sizes are within $\pm 1.0\text{mm}$.	Almost all specified functional sizes are within $\pm 1.0\text{mm}$.	More than half the specified functional sizes are within $\pm 1.0\text{mm}$.	Less than half the specified functional sizes are within $\pm 1.0\text{mm}$.	Few of the specified functional sizes are within $\pm 1.0\text{mm}$.
	Candidate worked with due care and attention to safety during all of the assembly activities.	Candidate worked with due care and attention to safety during almost all of the assembly activities.	Candidate worked with due care and attention to safety during more than half of the assembly activities.	Candidate worked with due care and attention to safety during some of the assembly activities.	Candidate worked with due care and attention to safety during a limited number of the assembly activities.
	Candidate worked independently during all of the assembly activities – assistance was generally not required.	Candidate worked independently during almost all of the assembly activities – a limited amount of assistance was required.	Candidate worked independently during most of the assembly activities – occasional guidance was required.	Candidate worked independently during some of the assembly activities – some guidance was required.	Candidate worked independently during a limited number of the assembly activities – significant guidance was required.
Mark range	17-20	13-16	9-12	5-8	0-4

3. Quality of manufacturing

The product to be manufactured involves the application of a range of manufacturing techniques. The quality of the work should be demonstrated in the level of consistency of application where the same technique has been used on two or more occasions. Credit should be given to candidates who show competence in carrying out the more difficult aspects.

Consideration should also be given at this stage to the degree of complexity in any practical creativity demonstrated by the candidate in completing the product.

Appropriate evidence for some aspects might be through observation and activities documented in the record of progress.

Judging the evidence for:					
3. Quality of manufacturing					
	Manufacturing techniques have been applied consistently across all of the work.	Manufacturing techniques have been applied with consistency across most of the work.	Manufacturing techniques have been applied with consistency across more than half of the work.	Manufacturing techniques have been applied with consistency across less than half of the work.	Manufacturing techniques have been applied with limited consistency across all, or almost all, of the work.
	Overall, the quality of the manufacturing is very good.	Overall, the quality of the manufacturing is good.	Overall, the quality of the manufacturing is competent.	Overall, the quality of the work is acceptable.	Overall, the quality of the manufacturing is limited.
	Candidate worked with due care and attention to safety during all of the manufacturing activities.	Candidate worked with due care and attention to safety during almost all of the manufacturing activities.	Candidate worked with due care and attention to safety during more than half of the manufacturing activities.	Candidate worked with due care and attention to safety during some of the manufacturing activities.	Candidate worked with due care and attention to safety during a limited number of the manufacturing activities.
	Candidate worked independently during all of the manufacturing activities – assistance was generally not required.	Candidate worked independently during almost all of the manufacturing activities – a limited amount of assistance was required.	Candidate worked independently during most of the manufacturing activities – occasional guidance was required.	Candidate worked independently during some of the manufacturing activities – some guidance was required.	Candidate worked independently during a limited number of the manufacturing activities – significant guidance was required.
Mark range	17-20	13-16	9-12	5-8	0-4

4. Surface finishing

There should be evidence of the surfaces being properly prepared prior to a surface finish being applied. The finish should be to a high standard and free of flaws or blemishes.

Judging the evidence for:					
4. Surface finishing					
	<p>The surface finish is to a very good standard – free from all major blemishes, eg scribe and hammer marks, surface scratches, welding spatter, engineer’s blue.</p> <p>Candidate worked with due care and attention to safety during all of the surface finishing activities</p> <p>Candidate worked independently during all of the surface finishing activities – assistance was generally not required</p>	<p>The surfaces have been finished to a good standard – few and minor marks and blemishes are present and would require final finishing work, eg a total of one or two across: light scribe and shallow hammer marks, surface scratches, few welding spatters, traces of engineer’s blue.</p> <p>Candidate worked with due care and attention to safety during almost all of the surface finishing activities</p> <p>Candidate worked independently during almost all of the surface finishing activities – a limited amount of assistance was required.</p>	<p>The surfaces have been finished to a competent standard few and minor marks and blemishes are present and would require final finishing work, eg a total of three or four across: light scribe and shallow hammer marks, surface scratches, some welding spatters, traces of engineer’s blue.</p> <p>Candidate worked with due care and attention to safety during more than half of the surface finishing activities</p> <p>Candidate worked independently during most of the surface finishing activities – occasional guidance was required.</p>	<p>The surfaces have been finished to an acceptable standard and marks and blemishes are present which will compromise the finish, eg a number of heavier scribe and deeper hammer marks, surface scratches, welding spatters, areas of engineer’s blue.</p> <p>Candidate worked with due care and attention to safety during some of the surface finishing activities</p> <p>Candidate worked independently during some of the surface finishing activities – some guidance was required</p>	<p>The surfaces have been finished to a limited standard and marks and blemishes are present which will significantly compromise the finish, eg a significant number of heavier scribe and deeper hammer marks, surface scratches, welding spatters, areas of engineer’s blue.</p> <p>Candidate worked with due care and attention to safety during a limited number of the surface finishing activities</p> <p>Candidate worked independently during a limited number of the surface finishing activities – significant guidance was required</p>
Mark range	17-20	13-16	9-12	5-8	0-4

Record of progress

The candidate's record of progress provides evidence of the work that has been undertaken and forms an essential part of the assessor's decision making process

The record of progress may be completed manually or electronically (such as a word processed document or blog), or spoken and recorded, or in any other appropriate format.

Assessors should ensure that the candidate has kept a record of the work undertaken on the manufacture of product. This should include:

- ◆ dates of when tasks have been completed
- ◆ brief description of what tasks have been completed, with an indication of areas that were an issue for candidates (if appropriate) – this section could also include any design decisions made by the candidate or where practical creativity has been demonstrated
- ◆ what tools, equipment and materials have been used
- ◆ a record of following safe working practices

Photographic evidence to support the assessment decisions made may also be recorded in the record. Assessors are asked to ensure that any photographic evidence produced is clearly identifiable as the candidate's work.

Administrative information

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History of changes

Version	Description of change	Authorised by	Date
1.1	Clarifications and additions to 'Evidence to be gathered'	Qualifications Development Manager	July 2013

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