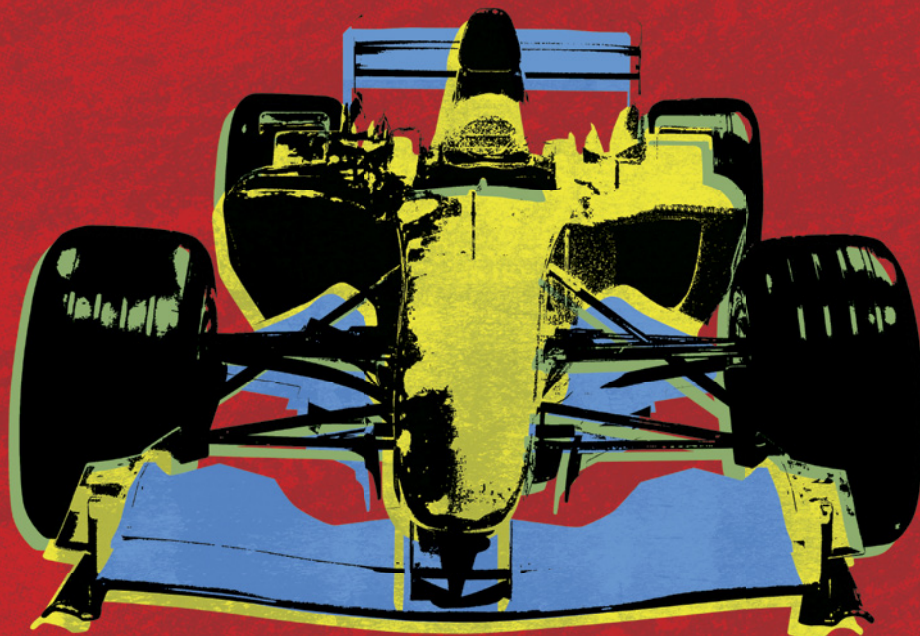


**Edexcel GCSE**

# **Engineering**

**Controlled Assessment**

**Teacher Support Book 2012**



# **Edexcel GCSE**

# **Engineering**

# **Controlled Assessment**

## **Teacher Support Book**

Unit 1 5EG01 Engineering Design and Graphical Communication

Unit 2 5EG02 Engineered Products

# **Welcome to the GCSE**

# **Engineering 2012**

# **Controlled Assessment**

# **Teacher Support Book**

This Controlled Assessment Teacher Support Book has been designed to provide you with the answers to key questions that will arise during the teaching and assessment of Controlled Assessment GCSE Engineering 2EG02, Units 1 and 2.

The book is divided into three sections. It contains content which is applicable for all options and some content which is specific to your chosen option.

Inside you will find some fantastic support and guidance, including:

- an introduction to controlled assessment
- the range of activities for the units
- a detailed overview of expected evidence
- FAQs

### **Expert advice from the people who know**

We hope you find this document useful and look forward to continuing to work with you on our GCSE specifications. We are on hand to answer your questions so please feel free to get in touch.



Ronald Watson  
Principal Moderator

To contact our GCSE Engineering senior examining team please visit the website [www.edexcel.com/expert](http://www.edexcel.com/expert).

To speak to our Engineering Subject team, please call **0844 463 2824** or email [TeachingEngineering@pearson.com](mailto:TeachingEngineering@pearson.com).

**We look forward to working with you.**

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# Unit 1: Engineering Design and Graphical Communication

# Unit 2: Engineered Products

## Levels of control in controlled assessment

The specification for this qualification states that controlled assessment is required for Unit 1 and Unit 2 and that three levels of control are set: for task setting, for task taking and for task marking.

### Task setting

Task setting is set at a high level of control. The controlled assessment tasks, written by Edexcel for these units, have been devised to provide this high level of control, whilst still allowing centres to contextualise the work set to meet local needs and to use the resources available to the centre.

The content of the controlled assessment tasks for Unit 1 and Unit 2 is defined through the specified overall parameters stated in the 2EG02 specification document. For Unit 1 and Unit 2, the assessment criteria define the range of activities that will be assessed in the controlled assessment, including the criteria that are designated for assessment of Quality of Written Communication (QWC), and an indication of the progressive reward given to levels of QWC across the mark ranges of the designated criteria. It is thus the 2EG02 specification for the units that sets the high level of control of the controlled assessment tasks for the units, allowing centres to contextualise the actual work set.

It should be further noted that within 5EG01 (Unit 1) at criterion (e) the 2EG02 qualification has a further specific controlled assessment task, that is defined more specifically and reviewed every two years. The task for criterion (e) and its assessment questions are found on the Edexcel website. The controlled assessment teacher guidance for 5EG01 contains the task drawings and the controlled assessment (candidate guide) for 5EG01 contains the questions. These documents are reviewed and updated every two years.

It is expected that centre assessors will affirm that the overall controlled assessment tasks at Unit 1 and Unit 2 and the specific controlled assessment task at Unit 1 criterion (e) were both completed under controlled assessment conditions (medium level of control) including within the overall 23–33 hours for each unit.

### Task taking

Task taking is set at a medium level of control. It is these controlled conditions in which candidates perform these tasks that are the main focus of this centre guidance.

### Task marking

Task marking is also set at a medium level of control. Marking of the tasks will be carried out by centre teachers and moderated by Edexcel. This guidance will inform the task marking stage through the identification of the expected evidence to be produced for the mark ranges. Centre teachers will be looking for, and noting, this evidence when they mark the candidate work against the assessment criteria. The attention of centre assessors is drawn to the Expected Evidence boxes in Section 3 of this document, for useful support and for guidance in how the various levels of evidence presented should be marked. It is these same criteria and guidance that are used by moderators when moderating centre marking as part of controlled assessment.

## Controlled conditions for task taking

Controlled assessment refers to the production of the evidence requirements for Unit 1 and Unit 2 under controlled conditions. Controlled assessment is a supervised period of approximately 23–33 hours for each unit, during which time the candidate produces the portfolio and product evidence that will be assessed. Controlled assessment is designed for the production and assessment of portfolio work and needs to be separated from the teaching and learning process.

The centre assessor needs to affirm that the time period conditions of controlled assessment were adhered to.

A current centre assessment policy might need to be developed on the basis of this guidance in order to incorporate controlled assessment requirements and procedures, including those applied for the controlled assessment task for criterion (e) at Unit 1.

The teaching, learning and practice processes that are necessary to prepare the candidate for the task taking period of controlled assessment will need to be designed, and delivered, before the controlled assessment period. Centre staff will not wish to use the time constraints of controlled assessment to undertake tutoring and tuition. The purpose of controlled assessment is to provide opportunity for the candidate to apply the skills and knowledge already learnt to the tasks contained in the controlled assessment task for each unit, in the time period allocated.

Candidate work for portfolios and products can be produced only during lesson time when supervised. Candidate work must be collected in at the end of each controlled assessment lesson and handed back out at the beginning of the next controlled assessment lesson. It needs to be noted here, too, that all manual and/or CAD production of engineering drawings, and of prototypes for evaluation, at Unit 1, should be carried out during controlled assessment time at the centre. Similarly at Unit 2, the practical mechanical/electronic manufacturing work, or other work, and any inspection and testing of products made, should be carried out at the centre under controlled conditions.

A feature of Unit 1 is criterion (e) 'Interpreting engineering drawings and circuit diagrams'. This criterion is separately assessed by a specific task found in the controlled assessment task for Unit 1 and needs also to be completed during a controlled assessment lesson under supervision.

Preparatory or developmental research, note-making, draft ideas, sketches, planning ideas, etc, may all be undertaken by the candidates away from the controlled conditions, ie may be undertaken at home by the candidate. Some or all of this may be committed to memory stick (or accessed learner ICT account). It is a feature of controlled assessment at medium level of control for task taking that such home-produced work brought into the centre can be use during the controlled task taking lessons for incorporation into the formal portfolio, for presentation and assessment. Teachers must monitor the work for authenticity. The designated 23–33 hours of controlled assessment for each unit should be viewed as the time-constrained opportunity to convert preparatory work to final portfolio version and to undertake, and provide evidence of, the various practical tasks required by both units.

It needs to be noted here, too, that all manual and/or CAD production of engineering drawings, and of prototypes for evaluation, at Unit 1, should be carried out during controlled assessment time at the centre. Similarly at Unit 2, the practical mechanical/electronic manufacturing work, or other work, and any inspection and testing of products made, should be carried out at the centre under controlled conditions.

The use of centre-prepared proformas or writing frames for completion by candidates for various tasks is well developed for this qualification and this practice may be continued. Centres should, however, note that the layout of proformas can limit candidates to the production of 'basic' identification evidence. Candidates need to be encouraged to provide descriptions and explanations in order to access the higher marks. This could be in the form of evidence which is extra to that provided through the use of proformas.

## The role of teachers during controlled assessment

During the controlled assessment periods, the role of the teacher is an important one. Teachers should:

- provide supervision of the controlled assessment conditions
- provide supervision of safe systems of working and of health and safety in general
- observe and record individual candidate performance, to inform their own marking of candidate evidence against the criteria, and the witness statement(s) they will need to make, particularly at Unit 2
- provide, and to be able to comment on, the levels of 'support and guidance' given to individual candidates for Unit 2, informing their marking decisions for the criteria for both units
- be able to confirm that the portfolio and product work presented was completed within the designated 23–33 hours
- be able to authenticate the candidate work
- provide formative feedback (see next page)
- supervise the controlled assessment activity for Unit 1 criterion (e).

A model suggested for controlled assessment of the controlled assessment task for criterion (e) at Unit 1 is as follows.

Candidates are made aware of the general task requirements at an early opportunity, to allow the opportunity to undertake practice exercises, if required. It may be explained that the task will require recognition and identification of standard features on mechanical and electrical/electronic engineering drawings, with explanation of the function of some of these attracting higher marks. Thus general practice exercises may be undertaken, without the use of the actual task at this stage. The general engineering studies for the Unit 3 paper can be linked to these practice exercises. At an appropriate time the assessor can release the drawings and questions for the controlled assessment of Unit 1 criterion (e). This controlled assessment is expected to be part of the 23–33 hours stipulation and it is not expected that further time will be allocated to improving answers to this activity after feedback from the teacher/assessor.

- ensure that individual contributions to any group work, when this occurs, are clearly identified and recorded by the candidate (affirmed by the teacher/assessor)
- note the accumulated time spent by individual candidates doing the controlled assessment, in line with centre policies as determined for the management of this.

## Formative feedback during controlled assessment

Teachers may provide regular formative feedback during controlled assessment. This might take the form of:

- indicating what is missing in candidate work reviewed, and pointing out what has not been evidenced
- indicating what is insufficient in the candidate work
- a discussion directly comparing work at a given stage with the requirements of the criteria by indicating what is evidenced, and what is not
- a review with the candidate of actual progress made, against planned progress within the controlled assessment period (possibly by indicating where time has been lost and how to focus on the parts which could generate the highest points in the time remaining)
- comments on the QWC provided and the level of marks likely to be obtained for this aspect of the assessment, where appropriate, perhaps suggesting spelling/grammar checks.

It should be noted that any amendment or development of the candidate work that is identified during this formative feedback must be undertaken during the controlled assessment period. Centres will need to point out at an early stage that further work to address criteria requirements to 'describe' and 'justify', for higher marks, must be done in the designated controlled period. (The portfolio work will not be taken away and re-worked outside the controlled conditions.)

As stated earlier, having undertaken the planned and controlled assessment activity for Unit 1 criterion (e), it is not expected that further time will be allocated to improving answers to this activity after feedback from the teacher.



# The range of activities for the units

The specifications and assessment criteria for Unit 1 and Unit 2 also indicate the ranges of tasks that need to be completed during controlled assessment. These are shown in the table below.

Unit 1	Unit 2
Produce an analysis of the brief*	Read and interpret specification and drawings
Produce a design specification*	Produce a production plan – resources and processes*
Produce design ideas*	Produce a production plan – production and constraints*
Testing to select final solution to be developed*	Use materials
Interpreting engineering drawings and circuit diagrams	Use parts and components
Use engineering drawing techniques	Use processes, tools and equipment
Produce engineering drawings to standard	Produce the product
Present final solution with modifications*	Test and evaluate the product*

\* Opportunity to be assessed on QWC.

The evidence of all these activities needs to be produced during the controlled assessment period. Centre staff will need to allocate appropriate times to each activity, so that 23–33 hours are used in total. Some guidance on suggested times is provided in the Sample Assessment Materials (SAM) publication produced by Edexcel for GCSE Engineering. It can be seen there that more than a half of the suggested time for each unit is allocated to the practical activities of ‘graphical communication’ (Unit 1) and ‘making the product’ (Unit 2) and to the presentation of the evidence for these activities.

For Unit 1, it follows that around half of the suggested time allocated for controlled assessment is allocated to analysis, development of design ideas, selection between the design ideas, and presentation and modification of the final design, including time for gathering and writing the evidence of these activities in final portfolio form. For Unit 2, a similar period is available to be devoted to interpretation, planning, testing and evaluation and to the gathering and presentation of these activities in final portfolio form.

These portfolio-building activities can realistically be allocated only some 10 hours for each unit.

Centres will therefore appreciate the importance of pre-teaching of and learning about the design process and graphical communication (for Unit 1) and about performing production techniques (for Unit 2) to be delivered **before** the controlled assessment period, so that this period can be used to focus on the necessary activities and the follow-up to any formative feedback provided.

## Section 2: Range of activities

Details of the activities required for the assessment of Unit 1 and Unit 2 are described in the controlled assessment tasks written by Edexcel. The evidence expected to be presented for each unit to satisfy the assessment requirements is detailed from the next page onwards.

### The assessment of quality of written communication

Both Unit 1 and Unit 2 specifications include assessment criteria that make provision for points to be awarded for the QWC used. The controlled assessment tasks devised for the controlled assessment of these units include this provision as required by the specification.

For both units, the candidate work required to achieve the standards needed for the QWC marks must also be done as part of the designated time of the controlled period.

# Expected evidence

## Unit 1: Engineering design and graphical communication

### (a) Analysing the brief\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Analysis of the brief to identify basic client needs, with identification of some key features of the engineered product. The key features identified are briefly listed, make little use of correct grammar and include frequent spelling mistakes, with incorrect or inappropriate use of terminology.	Analysis of the brief to identify the main client needs, with a description of the key features of the engineering product. The description of key features includes a sound standard of spelling and punctuation. Terminology is mostly used appropriately.	Analysis of the brief to explain the main client needs, with a justification of the key features of the engineering product. The analysis makes good use of accurate terminology and grammar, and few punctuation and spelling errors.
<b>Expected evidence</b>	<b>Expected evidence</b>	<b>Expected evidence</b>
Identification of basic client needs and some key features A brief listing of both (2)	Identification of main client needs (1) Description of key features (2) Sound spelling and terminology (1)	Explanation of client needs (2) Justification of key features (2) Accurate terminology, grammar and punctuation (2)
<p>Client needs include: cost, quantity required, intended market, timescales and product function.</p> <p>Key features include: product performance, styling and aesthetics, size, quality standards (such as BS, EN, CE, specific company standards, etc).</p> <p>*Credit for QWC is built into Expected Evidence requirements</p> <p>Key features for (a) and product criteria and production constraints for (b) (next page) may include similar evidence and obtain credit in both criteria.</p>		

## Section 3: Assessment information

### (b) Details of the design criteria and production constraints\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
<p>Production of a design specification that identifies the basic details of the product criteria and production constraints. Design specification makes little use of correct grammar and includes frequent spelling mistakes, with incorrect or inappropriate use of terminology.</p>	<p>Production of a design specification that describes some of the main details of the product criteria and production constraints. Details are presented using adequate standards of legibility, spelling and punctuation. Terminology is mostly used appropriately.</p>	<p>Production of a design specification that explains the main details of the product criteria and production constraints. Grammar, punctuation and few spelling errors and there is good use of accurate terminology.</p>
Expected Evidence	Expected Evidence	Expected Evidence
<p>Simple statements/listing of product criteria (1) Simple statement/listing of production constraints (1)</p>	<p>Well written description of some main details of the product criteria (2) Well written description of some main details of the production constraints (2)</p>	<p>Well written explanation of the main details of the product criteria (3) Well written explanation of the main details of the production constraints (3)</p>
<p>Product criteria includes: product performance, intended markets, maintenance requirements, size.</p> <p>Production constraints include: product regulations, cost, scale of production required, materials, quality standards, limitations of available machinery.</p> <p>*Credit for QWC is built into Expected Evidence requirements</p> <p>Key features for (a) above and product criteria and production constraints for (b) may include similar evidence and obtain credit in both criteria.</p>		

## Section 3: Assessment information

### (c) Ideas and design solutions\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Generation of basic design ideas and the development of simple design solutions. Ideas and solutions include frequent errors in spelling and grammar. Terminology is not used accurately or appropriately.	Generation of alternative design ideas and the development, in some detail, of design solutions. Ideas and solutions are presented using a sound standard of spelling and punctuation. Terminology is mostly used appropriately	Generation of imaginative design ideas and the development of detailed and appropriate design solutions. Few grammar, punctuation and spelling errors and there is good use of accurate terminology.
Expected Evidence	Expected Evidence	Expected Evidence
Two or three basic design ideas (1) Some development of at least one idea (1)	Two or three design ideas, one significantly different, appropriate terminology (2) Ideas developed to solutions in some detail, presented quite well (2)	Imaginative and different design ideas, good and consistent presentation (3) Detailed, appropriate and well presented development of solutions (3)
<p>Note: design development might include some use of scientific principle and calculation to illustrate design validity.</p> <p>Design ideas need to relate to engineering design of function, not focus on the 'product design' of form and aesthetics.</p> <p>*Credit for QWC is built into Expected Evidence requirements</p>		

## Section 3: Assessment information

### (d) Testing and selecting the final solution\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Present limited testing against some of the design criteria in order to select the final design solution. There is little evidence of why the final design idea was chosen. Written evidence is poorly presented with little use of the appropriate terminology	Present a range of testing against the design criteria in order to select the final design solution. Describe, in some detail, how the final design solution meets the main design criteria. Written evidence is generally free of spelling and grammatical errors and terminology is mostly used accurately and appropriately.	Present objective testing against the design criteria in order to select and justify the final design solution. Written evidence is clear, with consistent use of spelling, punctuation and grammar and there is good use of accurate terminology.
Expected Evidence	Expected Evidence	Expected Evidence
Simple testing by subjective scoring against criteria (a table) (1) Simple statement of selection of the single design solution (1)	A range of testing approaches used (2) Use of a range of testing to select final solution and describe in some detail how solution meets main criteria, presented accurately (2)	A range of objective tests used (3) Use of this objective testing to select and justify detailed final solution, presented with consistent accuracy (3)
<p>Simple testing may be subjective scoring of the design ideas against some of the design criteria.</p> <p>A range of testing should include a number of different tests, e.g. models, different prototype circuit arrangements, mock-ups to check clearances, calculations to test load-bearing.</p> <p>Objective testing should employ appropriate testing of developed prototypes, using measurements on different variations in order to select and justify.</p> <p>Note: class questionnaires are not encouraged for this criterion – these can lead to solutions that lie outside the customer design brief.</p> <p>*Credit for QWC is built into Expected Evidence requirements</p>		

## Section 3: Assessment information

### (e) Interpreting engineering drawings and circuit diagrams

Mark range 1–2	Mark range 3–4	Mark range 5–6
Read engineering drawings and circuit diagrams and name the components/features.	Read and interpret engineering drawings and circuit diagrams and name and explain the function of some of the components/features.	Read and interpret engineering drawings and circuit diagrams and name and explain the function of each component/feature.
<b>Expected Evidence</b>	<b>Expected Evidence</b>	<b>Expected Evidence</b>
Correct answers to question 1–5 (1) and to question 6 (1)	As previous mark range (2) Explain the function of two components in question 7 (2)	As previous mark range (4) Explain the function of remaining two components in question 7 (2)
This criterion is assessed by a separate task detailed in the controlled assessment task written for this unit.		

### (f) Selecting engineering drawing techniques

Mark range 1–2	Mark range 3–4	Mark range 5–6
Selection and use of a limited range of engineering drawing techniques to communicate some aspects of the final solution. The selection of drawing techniques takes some account of the purpose of the drawing.	Selection and use of a range of engineering drawing techniques to communicate, in some detail, the final solution. The selection of drawing techniques takes some account of the purpose of the drawing and the intended audience.	Selection and use of an effective range of engineering drawing techniques to communicate, in detail, the final solution. The selection of drawing techniques takes considered account of the purpose of the drawing and the intended audience.
<b>Expected Evidence</b>	<b>Expected Evidence</b>	<b>Expected Evidence</b>
Selection of limited range of techniques with some account of purpose indicated (1) Use of a limited range of techniques with little detail communicated (1)	Wider range of techniques selected with reference to purpose and intended audience (2) Wider range used to communicate some detail of the final solution (2)	Widest range selected with considered account of purpose and intended audience (3) Widest range used effectively to communicate full detail of final solution (3)
<p>Note: the range of drawing techniques is identified as: freehand sketches, perspective drawings, block and flow diagrams, schematic diagrams, circuit diagrams, 1<sup>st</sup>/3<sup>rd</sup> angle orthographic projections, assembly diagrams and exploded diagrams.</p> <p>The widest range of drawings would include CAD techniques and exploded diagrams are likely to use 3D CAD techniques.</p> <p>The types of audience listed in the specification are service engineers, manufacturing engineers and technical customers, though others may be included.</p>		

## Section 3: Assessment information

### (g) Producing engineering drawings

Mark range 1–2	Mark range 3–5	Mark range 6–8
Production of basic engineering drawings that show limited compliance with sector-specific standards and conventions. Drawings include the use of some relevant common standard symbols.	Production of engineering drawings that comply, in some detail, with sector-specific standards and conventions. Use of a range of relevant standard symbols for the named components.	Production of appropriate manual and CAD engineering drawings that comply with sector-specific standards and conventions.
Expected Evidence	Expected Evidence	Expected Evidence
Basic engineering drawings with limited compliance (1) Some relevant common standard symbols (1)	Manual or CAD engineering drawings that include detail of a range of parts and components, using sector-specific standards and conventions (3)  A range of relevant standard symbols used for named components (2)	Previous range of engineering drawings but in manual and CAD form (6)  CAD Assembly diagrams and exploded views included (2)
<p>Note: This criterion awards a greater amount of credit (8 marks) and is an opportunity to gain credit for drawing skills.</p> <p>Note: The range of engineering drawings for this criterion only includes: orthographic projection and circuit diagrams (electrical/electronic and/or pneumatic/hydraulic). Parts and components need to be included for higher mark ranges, which makes assembly drawings and exploded views appropriate for the highest score.</p> <p>The drawings assessed for this criterion (g) will form part of the range of drawings presented for criterion (f).</p> <p>Applicable drawing standards are listed in the controlled assessment task for this unit and the common standard symbols and conventions referred to include: border, title block, dimensions, centre lines and electrical, electronic and mechanical features and components.</p>		



## Section 3: Assessment information

### (h) Presenting and modifying the final design solution\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Limited description of how the final design solution meets the client design brief and design specification, identifying some relevant modifications. Written evidence is poorly presented with little use of appropriate terminology.	Description, in some detail, of how the final design solution meets the client brief and design specification, describing relevant modifications. Written evidence is generally free of errors and terminology mostly used appropriately	Detailed explanation of how the final design solution meets the brief and specification, explaining relevant modifications. Written evidence is clear, with few, if any, spelling or punctuation mistakes and there is good use of accurate terminology.
Expected Evidence	Expected Evidence	Expected Evidence
Portfolio serves as presentation document with limited description of how solution meets brief (1) Some modifications identified (1)	Portfolio serves as presentation document and describes in some detail and with general quality how the final solution meets the brief (2) Relevant modifications are described using appropriate terminology (2)	Detailed explanation provided in portfolio with high quality of presentation (3) Relevant modifications are explained clearly and accurately (3)
<p>Note: teacher/other can act in client role to receive portfolio (as design solution presentation document) and offer relevant modifications.</p> <p>For all mark ranges, candidates need to produce a separate description or detailed explanation of how the final solution meets the brief including detail of earlier modifications, adding these to the portfolio to form the presentation document for submission to client or proxy.</p> <p>Following presentation, which need not be a verbal one, the candidate needs to identify and describe/explain further modifications.</p> <p>*Credit for QWC is built into Expected Evidence requirements.</p>		

## Section 3: Assessment information

### Unit 2: Engineered products

#### (a) Read and interpret a product specification and engineering drawings/diagrams

Mark range 1–2	Mark range 3–4	Mark range 5–6
With support and guidance, use of some information within a product specification and interpretation of basic details in engineering drawings and/or diagrams.	With limited support and guidance, use of the main information within a product specification and interpretation of the main details in engineering drawings and diagrams.	Independent and confident use of the main information within a product specification and competent interpretation of the main details in engineering drawings and diagrams.
Expected Evidence	Expected Evidence	Expected Evidence
<p>Witness testimony to significant extent of support and guidance alongside portfolio evidence that:</p> <ul style="list-style-type: none"> <li>Shows use of some information (1)</li> <li>Limited interpretation of basic details (1)</li> </ul> <p>Both elements may be assessed across whole of unit</p>	<p>Witness testimony to limited support and guidance alongside portfolio evidence that shows:</p> <ul style="list-style-type: none"> <li>Use of main information (2)</li> <li>Interpretation of main details (2)</li> </ul> <p>Both elements may be assessed across whole of unit</p>	<p>Witness testimony to independence and portfolio shows:</p> <ul style="list-style-type: none"> <li>Confident use of the main information (3)</li> <li>Competent interpretation of the main details (3)</li> </ul> <p>Both elements may be assessed across whole of unit</p>

Note: the candidate must receive a written product specification and all relevant engineering drawings necessary to make the product. The product specification should include all product details such as: dimensions, tolerances, fit, finish performance and quality, and these may be provided in part on suitable drawings. Engineering drawings supplied should conform to sector-specific standards and conventions.

Note: the witness testimony supports candidate work on the criterion presented in the portfolio.

Holistic evidence across the whole unit may be used for the assessment of this criterion; scores given here need to be coherent with those given at criteria (b), (c), (g) and (h).

This criterion is probably assessed at the portfolio completion stage.

Note: the use of the word 'competent' in the highest mark range does require clear evidence across the unit of the use of skill to make a complete product.

## Section 3: Assessment information

### (b) Produce a production plan which includes information about resources and processing requirements\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
With support and guidance, produce a production plan that identifies basic details of resources and processing requirements. Production plan includes frequent errors in spelling and grammar. Terminology is not used accurately or appropriately.	With limited support and guidance, produce a production plan that identifies the most important details of resources and processing requirements. Production plan is legible and includes a sound use of spelling and punctuation. Terminology is mostly used appropriately.	Independently produce a production plan that identifies fully the main details of the resources and processing requirements. Grammar, punctuation and spelling errors are unusual and there is good use of accurate terminology.
<b>Expected Evidence</b>	<b>Expected Evidence</b>	<b>Expected Evidence</b>
<p>Witness testimony to significant extent of support and guidance alongside a production plan showing:</p> <ul style="list-style-type: none"> <li>• Basic details of resources (1)</li> <li>• Basic details of processing requirements (1)</li> </ul>	<p>Witness testimony to limited support and guidance alongside well presented production plan identifying the most important details:</p> <ul style="list-style-type: none"> <li>• Of resources (2)</li> <li>• Of processing requirements (2), using terminology that is mostly appropriate</li> </ul>	<p>Witness testimony to independent production of a production plan that uses high quality of written communication with few errors and accurate terminology and identifies fully:</p> <ul style="list-style-type: none"> <li>• The main details of resources (3)</li> <li>• The main details of processing requirements (3)</li> </ul>

Note: resources include details of materials, parts, components, tools and equipment, including measuring equipment you will use at (g) and (h) and any assembly techniques required.

Processing requirements need to be detailed in your plan; some of these details may be included as 'production requirements/details' for (c), e.g. details of processes to be used – lathe turning, drilling, cutting, soldering, spot welding, inspection.

The unit specification provides a list of processes expected to be included: removal, shaping, joining, heat and chemical treatment and surface finishing.

Higher marks are awarded if the production plan has detailed description/explanation enough to be followed by a third party.

\* Credit for QWC is built into Expected Evidence requirements.

Again, the witness testimony serves to support candidate work presented for the criterion.

## Section 3: Assessment information

### (c) Produce a production plan which includes information about production details and constraints\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
<p>With support and guidance, produce a production plan that identifies basic details of production requirements and constraints. Production plan includes frequent errors in spelling and grammar. Terminology is not used accurately or appropriately.</p>	<p>With limited support and guidance, produce a production plan that identifies the most important production requirements and constraints. Production plan is legible and includes a sound use of spelling and punctuation. Terminology is mostly used appropriately.</p>	<p>Independently produce a production plan that identifies fully the main details of production requirements and constraints. Grammar, punctuation and spelling errors are unusual and there is good use of accurate terminology.</p>
Expected Evidence	Expected Evidence	Expected Evidence
<p>Witness testimony to significant extent of support and guidance alongside a production plan showing:</p> <ul style="list-style-type: none"> <li>• Basic details of production requirements (1)</li> <li>• Basic details of production constraints (1)</li> </ul>	<p>Witness testimony to limited support and guidance alongside well presented production plan identifying the most important details:</p> <ul style="list-style-type: none"> <li>• Of production requirements (2)</li> <li>• Of production constraints (2), using terminology that is mostly appropriate.</li> </ul>	<p>Witness testimony to independent production of a production plan that uses high quality of written communication with few errors and accurate terminology and identifies fully:</p> <ul style="list-style-type: none"> <li>• The main details of production requirements (3)</li> <li>• The main details of production constraints (3)</li> </ul>
<p>Note: production details/requirements include machine settings and speeds, tooling details, sequence of production, health and safety requirements for the process.</p> <p>Production constraints include quality control points (from the specification), deadlines, machine availability, inspection procedures, cost of materials and machine time.</p> <p>Again witness testimony supports candidate work as presented.</p> <p>*Credit for QWC is built into Expected Evidence requirements.</p>		

## Section 3: Assessment information

### (d) Identify, prepare and use materials

Mark range 1–2	Mark range 3–4	Mark range 5–6
Identify and prepare, with guidance, some appropriate materials, using them safely with some skill to make a product.	Identify and prepare, with limited guidance, appropriate materials, using them safely with skill to make a product.	Identify and independently prepare appropriate materials, using them safely with skill and accuracy to make a product.
Expected Evidence	Expected Evidence	Expected Evidence
<p>Witness testimony to significant extent of guidance:</p> <ul style="list-style-type: none"> <li>To identify and prepare some appropriate materials (1)</li> <li>To use them safely with some skill to make the product (1)</li> </ul>	<p>Witness testimony to limited guidance given:</p> <ul style="list-style-type: none"> <li>To identify and prepare appropriate materials (2)</li> <li>To use them safely with skill to make the product (2)</li> </ul>	<p>Witness testimony to independent:</p> <ul style="list-style-type: none"> <li>Identification and preparation of appropriate materials (3)</li> <li>Use of materials safely with skill and accuracy to make the product (3)</li> </ul>
<p>Note: marks at the higher mark ranges should be coherent with those given for criteria (f) and (g) and work short of completion of the product should be assessed to take account of this.</p> <p>The highest mark range scores for accuracy need to be coherent with scores given at criteria (f) and (g).</p> <p>Note: materials are as stated in the given specification but correct choice of grade or condition from store can be rewarded.</p>		

## Section 3: Assessment information

### (e) Identify, prepare and use parts and components

Mark range 1–2	Mark range 3–4	Mark range 5–6
With guidance and support, identify and prepare some appropriate parts and components, using them safely with some skill to make a product.	With limited guidance and support, identify and prepare appropriate parts and components, using them safely with skill to make a product.	Independently identify and prepare appropriate parts and components, using them safely with skill and accuracy to make a product.
Expected Evidence	Expected Evidence	Expected Evidence
<p>Witness testimony to significant extent of guidance and support:</p> <ul style="list-style-type: none"> <li>To identify and prepare some appropriate parts and components (1)</li> <li>To use them safely with some skill to make the product (1)</li> </ul>	<p>Witness testimony to limited guidance and support given:</p> <ul style="list-style-type: none"> <li>To identify and prepare appropriate parts and components (2)</li> <li>To use them safely with skill to make the product (2)</li> </ul>	<p>Witness testimony to independent:</p> <ul style="list-style-type: none"> <li>Identification and preparation of appropriate parts and components (3)</li> <li>Use of appropriate parts and components safely with skill and accuracy to make the product (3)</li> </ul>
<p>Note: marks at the higher mark ranges should be coherent with those given for criteria (f) and (g) and work short of full completion of the product should be assessed to take account of this.</p> <p>The highest mark range scores for accuracy need to be coherent with scores given at criteria (f) and (g).</p> <p>Note: parts and components are to be 'bought-in' and as stated in the specification or identified through interpretation of given drawings. Identification can be from specification and catalogues and/or stock and preparation can be as necessary, e.g. component legs, sets of nuts, bolts and washers.</p>		

## Section 3: Assessment information

### (f) Select and use processes, tools and equipment

Mark range 1–2	Mark range 3–5	Mark range 6–8
Select and use, with guidance, some appropriate processes, tools and equipment, using them safely, with guidance and support, and exhibiting some skill to make a product.	Select and use, with limited guidance, appropriate processes, tools and equipment, using them safely with limited guidance and skill to make a product.	Independently select appropriate processes, tools and equipment, using them safely with skill and accuracy to make a product.
Expected Evidence	Expected Evidence	Expected Evidence
<p>Witness testimony to extent of guidance given in the selection and use of appropriate processes, tools and equipment (1)</p> <p>Witness testimony to the amount of guidance and support given to use them safely with some skill to make the product (1)</p>	<p>Witness testimony to limited guidance given in the selection and use of appropriate processes, tools and equipment (2)</p> <p>Witness testimony to the limited guidance given to use them safely with skill to make the product (3)</p>	<p>Witness testimony to independent selection of appropriate processes, tools and equipment (3)</p> <p>Witness testimony to the safe use of processes, tools and equipment with skill and accuracy to make the product (5)</p>
<p>Note: for each mark range, marks are available for the selection and use of the processes, tools and equipment, whether or not the product is completed. Further marks are available at each mark range for application of safe work, skill and accuracy and these marks should be coherent with those given at (g). This coherence should include the case where marks given at (g) are for an incomplete product and also include coherence with those marks given at (g) for the use of measuring equipment to show skill and accuracy.</p> <p>At all points, witness testimony should be given in support and confirmation of candidate evidence of skill and accuracy and product completion.</p> <p>Processes, tools and equipment are as identified at the production planning stage.</p>		

## Section 3: Assessment information

### (g) Produce an engineered product

Mark range 1–2	Mark range 3–4	Mark range 5–6
Production of an incomplete engineered product with some skill and accuracy.	Production of an engineered product that has been assembled and finished with skill, although there may be some aspects where accuracy or quality could still be improved on.	Production of a high-quality engineered product that has been assembled and finished with a high level of skill and accuracy.
<b>Expected Evidence</b>	<b>Expected Evidence</b>	<b>Expected Evidence</b>
Witness testimony to support the part-completion of the product (1) Inspection sheets show part-product made with some skill and accuracy (1)	Witness testimony to support completion, assembly and finish of engineered product (2) Inspection sheets that may show some lack of accuracy/quality (2)	Witness testimony to support high quality completion, assembly and finish of engineered product (3) Inspection sheets show high level of skill and accuracy (3)
<p>Note: the use of 'accuracy' in the mark ranges implies the use of inspection sheets to present measurement data taken on parts made, checking dimensions against those specified, including tolerance bands.</p> <p>Marks given for this criterion would be expected to have coherence with those given at (d), (e) and (f), including for part-completion at the lower mark range.</p> <p>Witness testimony should be provided in support of candidate evidence of incomplete/complete product and of level of skill and accuracy.</p>		



## Section 3: Assessment information

### (h) Testing and evaluation\*

Mark range 1–2	Mark range 3–4	Mark range 5–6
Carry out basic testing against some aspects of the product specification and demonstrate that the product has limited compliance with the required standards. Written evidence is poorly presented with little use of appropriate terminology.	Carry out a range of testing against the product specification and demonstrate that the product complies with the main required standards. Written evidence is generally free of errors and terminology mostly used appropriately.	Carry out objective testing against the product specification and demonstrate that the product consistently complies with the required standards. Written evidence is clear, with consistent use of spelling or punctuation and grammar and there is good use of accurate terminology.
Expected Evidence	Expected Evidence	Expected Evidence
Test data that shows some basic testing of the product, poorly identified and presented (1) Use of the test data to show that the product has limited compliance to required standards, poor use of appropriate terminology (1)	Test data from a range of testing identified and presented well (2) Use of the test data to show that the product complies with the main required standards with mostly good use of terminology (2)	Quantitative data from repeated testing presented clearly with accurate terminology (3) Use of the test data to show that the product complies consistently with the required standards, written clearly and accurately with good use of accurate terminology.
<p>Note: this criterion requires that the completed functioning product is tested against the specified product performance, rather than the detailed production control measurements that are rewarded in (g).</p> <p>*Credit for QWC is built into Expected Evidence requirements.</p> <p>Note: a range of testing against requirements might include overall mass/weight/dimensions, qualitative output performance. Qualitative output performance might include features such as design load carried, alarm rings, lamp lights, output shaft rotates.</p> <p>Objective testing should include quantitative instrument measurements on output, eg voltage outputs at different speeds, speed outputs at different pressures or loadings, long term tests; tests designed to show whole range of required standards.</p>		

### FAQs: Preparing to teach controlled assessment

Before you can plan your teaching, you will need to have an idea of how the controlled assessment is to be assessed and what candidates have to do. Here are some important answers to frequently asked questions about controlled assessment.

#### What is controlled assessment?

Controlled assessment has replaced coursework and is the new form of internal assessment required when assessing GCSE Engineering internally assessed units.

The main difference between the previous style of assessment of coursework and controlled assessment is that assessment activities for Units 1 and 2 must now be undertaken using various levels of control that were not previously in place.

There are three elements attached to controlled assessment and these are task setting, task taking and task marking. These elements are subject to varying levels of control.

#### When can I offer the controlled assessment unit?

Candidates must submit their completed activities for controlled assessment in the summer series at the end of the course. However this does not prevent candidates from being assessed much earlier in the course, provided completed assessments are retained securely at the centre premises before submission by 15th May of the final assessment year. Effectively, whenever the teachers feel that the candidates have been taught all they need and teaching and learning has been completed, controlled assessment can start.

#### Can I start controlled assessment in Year 9?

Controlled assessment can be done at any time. However, it is stressed that controlled assessment needs to be undertaken after considerable learning in engineering design techniques, graphical communication and production techniques has been achieved, before these are assessed under controlled conditions. It is not, therefore, recommended that controlled assessment takes place much before the qualification is planned to be completed.

#### When will I be able to access the task?

The controlled assessment task for each unit is published on the subject page of the Edexcel website: [www.edexcel.com/quals/gcse/gcse09/engineering](http://www.edexcel.com/quals/gcse/gcse09/engineering).

They are subject to review every two years.

The controlled assessment tasks for Unit 1 and Unit 2 will be published on Edexcel's website each September. Teachers will need to contextualise these tasks to ensure that the activities undertaken meet local needs and can also be undertaken with the resources available in individual centres.

Page 1 of this Teacher Support Book also deals with the specific controlled assessment task for Unit 1 criterion (e) and the appropriate paragraph indicates where on the Edexcel website (see above link and 'controlled assessment' within it) the necessary task drawings and questions may be found. The eighth bullet point on page 3 of this support book also provides a suggested/recommended model for the management of this controlled assessment task for Unit 1 criterion (e) so that controlled assessment conditions are followed. Access to this specific task needs to be carefully controlled at the centre.

## Section 3: Assessment information

### When can candidates see the task?

The specification and assessment criteria for each of Unit 1 and Unit 2 provide the general controlled assessment tasks so that candidates can see these at the earliest stage, as an introduction to the need to learn about, and practice, the engineering design and production processes, and graphical communication and production techniques. This tuition will continue until the controlled assessment begins (at the centre's own timing) with given customer brief for design work (Unit 1) and given product specification and drawings for making the given product (Unit 2).

Necessary arrangements for 'seeing' the specific controlled assessment task for criterion (e) of Unit 1 are described above in the FAQs and in the body of this Teacher Support Book.

### Can I set homework as part of controlled assessment?

The medium level of control of task-taking is to help ensure the authenticity of candidate work. The 23–33 hours of controlled assessment is also to give an opportunity for all candidates at a centre to have access to standard equipment and ICT for drawing and manufacturing, and for portfolio-building. It is not expected, therefore, that homework will be set as a direct part of controlled assessment.

It is in the nature of engineers even at this level, to 'think' about the solution to problems away from the workplace, or school or college. From this perspective, the kind of planning, drafting, etc, that might take place 'at home' cannot be disallowed. The centre will have a policy on candidates bringing in memory sticks generally (and possibly about remote access to school/college ICT accounts) containing draft work done at home, and recorded on paper or on ICT media. Such draft work done at home and recorded for insertion/development in their Engineering GCSE portfolios, needs to be considered in light of this policy and controlled for authenticity.

At Unit 1 the 'administrative planning and drafting', and any 'creative thinking' done at home, all needs to be 'written up' into portfolios during controlled assessment at the centre and assessors need to exercise the appropriate levels of control on this. The manual and CAD production of engineering drawings, prototype testing and modifications should be centre-based controlled assessment activities.

At Unit 2, similarly, work away from controlled assessment on the administrative planning and drafting of portfolio sectioning and presentation should be an expectation of the candidate, so that she/he 'hits the ground running' in controlled assessment sessions. The gathering-together of photo-narrative for the presentation of evidence of making the product needs also to be supervised under the medium control of controlled assessment. The actual making-process and inspection and testing needs to be witnessed (the assessment criteria detail the 'levels of guidance' to be witnessed) and therefore be centre-based and the centre assessor needs to be present and ensure that the presented evidence is coherent with observation.

This is all part of the assessment function at the centre.

### Can candidates use ICT at home to do some of their write-up?

Page 2 of this Teacher Support Book outlines the occasions when draft work may be produced at home, including the use of ICT memory sticks (or other technologies using remote access) to bring these drafts to school/college for entry into portfolios for completion.

At Unit 1 such use of ICT should not include the use of home-based CAD packages for the assessed engineering drawings required for assessment. Such manual and CAD drawings should be produced under controlled assessment conditions, using standard ICT facilities and software at the centre. At Unit 2, home-based production of artefacts, with or without ICT, is less likely but the same standardised approach should apply.

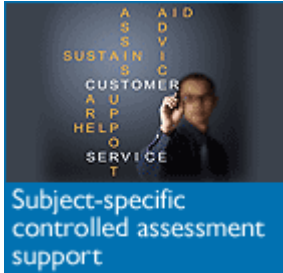
## Section 3: Assessment information

The centre may need to develop its general assessment policy and its specific ICT usage policies to embrace the use of ICT at home for draft work towards controlled assessment. Centre teachers and assessors will know, or seek to find out, what is their own candidates' ICT work and indicate this in marking and comment. Continuing issues around authenticity of work will need to be reported to Edexcel via the usual moderation process.

This role of teachers/assessors in the authentication of candidate work, whether done at the centre or not, is referred to and confirmed in page 3 of this support book, at 'The Role of Teachers' listing.

### Supporting you with controlled assessment

Need help with controlled assessment? Our experts are on hand to support you...



- Email the subject team directly at [TeachingEngineering@pearson.com](mailto:TeachingEngineering@pearson.com).
- Call 0844 463 2824 to speak to a member of the engineering team.
- [Ask the Expert](#), our free email service, puts you in direct contact with a senior examiner who will help answer any subject-specific questions concerning the teaching of engineering. They will email you within two working days of receiving your question.



You can find all the documents relating to controlled assessment below (as well as on the main [GCSE Engineering](#) page).

You should also refer to the [JCO controlled assessment guidance document](#).

