

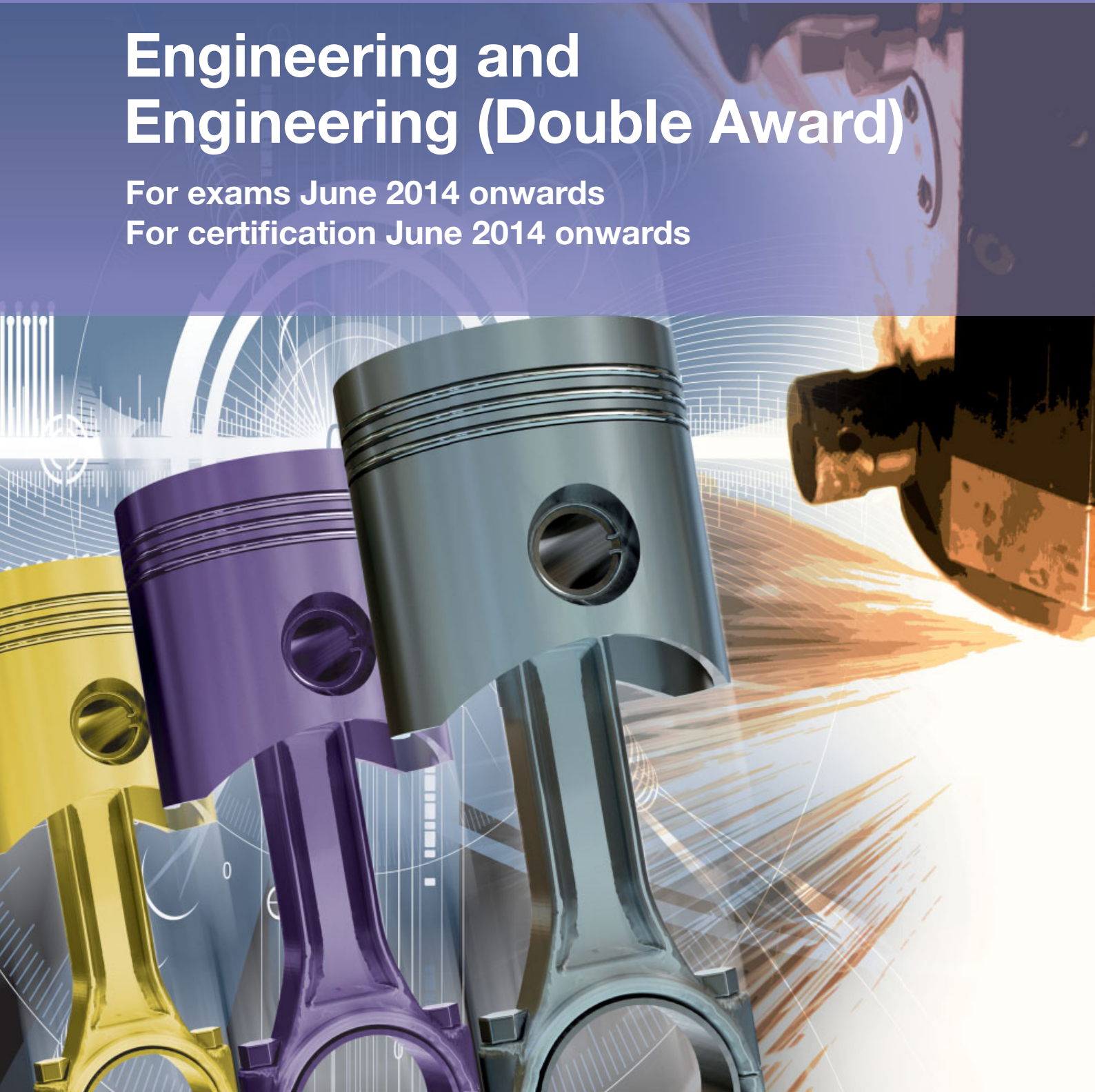
GCSE

Specification

Engineering and Engineering (Double Award)

For exams June 2014 onwards

For certification June 2014 onwards



GCSE

Specification

Engineering

4850

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1 Introduction

1.1 Why choose AQA?

AQA is the UK's favourite exam board and more students receive their academic qualifications from AQA than from any other board. But why is AQA so popular?

AQA understands the different requirements of each subject by working in partnership with teachers. Our GCSEs:

- enable students to realise their full potential
- contain engaging content
- are manageable for schools and colleges
- are accessible to students of all levels of ability
- lead to accurate results, delivered on time
- are affordable and value for money.

AQA provides a comprehensive range of support services for teachers:

- access to subject departments
- training for teachers including practical teaching strategies and approaches that really work presented by senior examiners
- personalised support for Controlled Assessment
- 24 hour support through our website and online *Ask AQA*
- past question papers and mark schemes
- comprehensive printed and electronic resources for teachers and students

AQA is an educational charity focused on the needs of the learner. All our income goes towards operating and improving the quality of our specifications, examinations and support services. We don't aim to profit from education – we want you to.

If you are an existing customer then we thank you for your support. If you are thinking of moving to AQA then we look forward to welcoming you.

1.2 Why choose Engineering?

Intended as an introduction to Engineering, this qualification allows students to develop skills and understanding which will be of use generally and as part of a progressive career path leading to further technical or academic engineering qualifications.

This specification is a development of the successful Engineering GCSE but allows more curriculum flexibility as it can be offered as either Single or Double Award.

A major change of this specification is that it integrates designing, making and the applications of technologies whilst allowing schools and colleges to devise programmes which can be delivered as manageable tasks.

The Double Award builds on the core provided by studying the Single Award content and so provides a coherent programme for learners.

1.3 How do I start using this specification?

Already using the existing AQA Engineering specification?

- Register to receive further information, such as mark schemes, past question papers, details of teacher support meetings, etc, at **<http://www.aqa.org.uk/rn/askaqa.php>**
Information will be available electronically or in print, for your convenience.
- Tell us that you intend to enter candidates. Then we can make sure that you receive all the material you need for the examinations. This is particularly important where examination material is issued before the final entry deadline. You can let us know by completing the appropriate Intention to Enter and Estimated Entry forms. We will send copies to your Exams Officer and they are also available on our website (**http://www.aqa.org.uk/admin/p_entries.php**).

Not using the AQA specification currently?

- Almost all centres in England and Wales use AQA or have used AQA in the past and are approved AQA centres. A small minority is not. If your centre is new to AQA, please contact our centre approval team at **centreapproval@aqa.org.uk**

1.4 How can I find out more?

Ask AQA

You have 24-hour access to useful information and answers to the most commonly-asked questions at **<http://www.aqa.org.uk/rn/askaqa.php>**

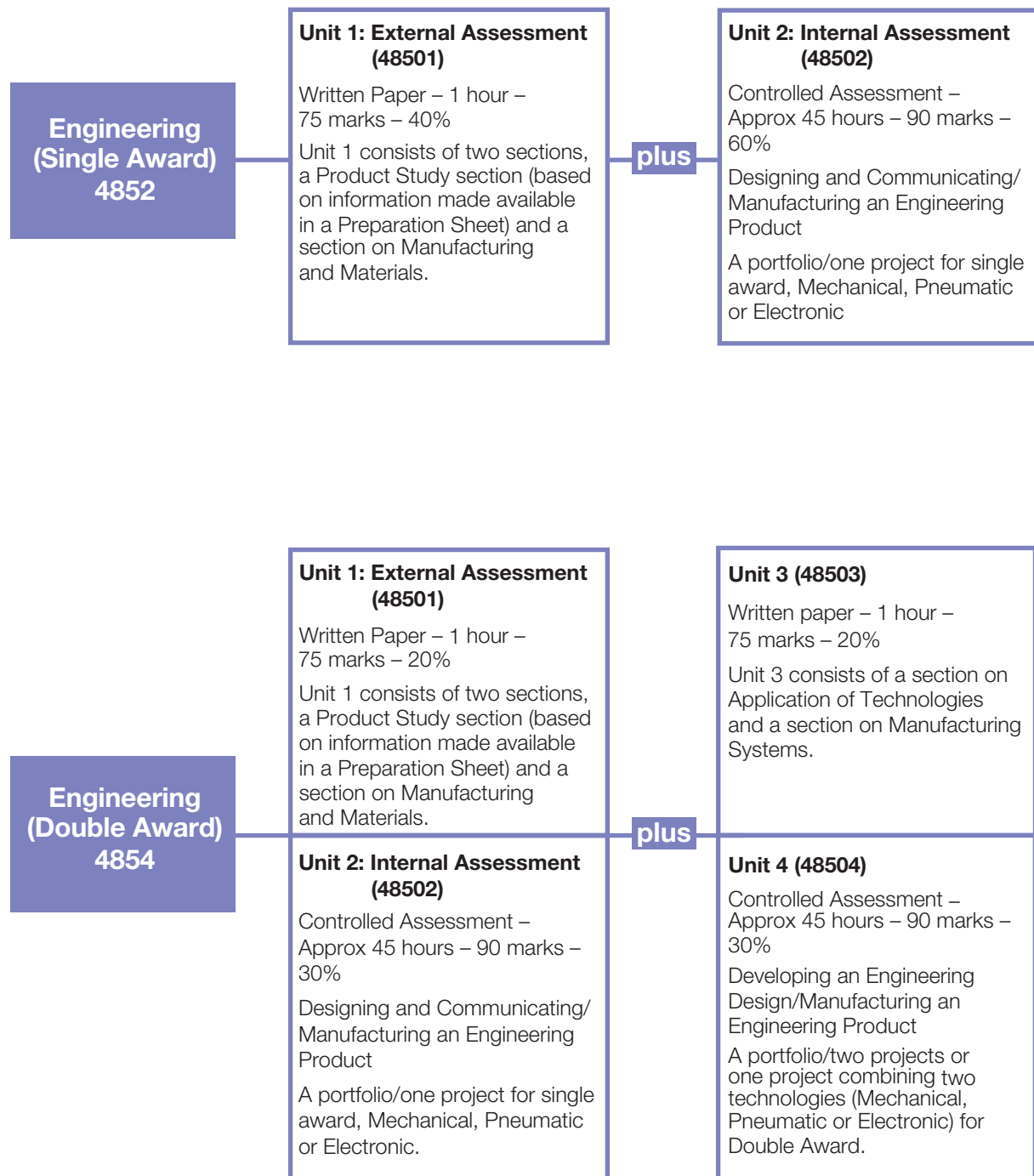
If the answer to your question is not available, you can submit a query for our team. Our target response time is one day.

Teacher Support

Details of the full range of current Teacher Support and CPD courses are available on our web site at **<http://web.aqa.org.uk/qual/cpd/index.php>**

There is also a link to our fast and convenient online booking system for all of our courses at **<http://coursesandevents.aqa.org.uk/training>**

2 Specification at a Glance



For assessments and subject awards after June 2013 there is a requirement that 100% of the assessment is terminal.

3 Subject Content

3.1 Unit 1 Materials, Technologies and Design Considerations

This unit provides details of the subject content to be covered by candidates for the Single Award. Candidates are required to use the stated knowledge and understanding in the Unit 1 examination and in the completion of their Controlled Assessment in Unit 2.

The content has been divided into two sections:

Designing and Communicating
Understanding Engineered Products

Designing and communicating

Use a client design brief

To determine the function and user requirements
To establish the limits or constraints on a design

Convert a client design brief to a specification

To specify: size, shape, function, limiting features, functional requirements

Use and modify a specification

Use the design process to

Generate ideas/possible design solutions for engineered products

Produce a solution expressed as a drawing/model

Simple drawing techniques

Orthographic projection – third angle only
Isometric projection

Manual drawing methods

Formal drawing and sketching
Scale – 1:1 1:2 1:5

Computer Aided Design

2D using standard conventions either electrical or mechanical

3D solid modelling

Using a computer program to simulate the operation of an electrical or mechanical system

Explain a design proposal to a third party

Use drawings or models to present ideas
Respond to client feedback

Understanding engineered products

Materials

- Polymers
- Ferrous metals
- Common non-ferrous metals and alloys
- Composites
- Ceramics

Ability to be

- shaped and formed
- machined
- treated
- given a surface finish
- re-cycled and re-used

Comparative ease of handling, cost, availability and form

Components

- Mechanical
- Electrical and electronic
- Pneumatic/hydraulic

Production methods including mould and jig use

Manufacturing an Engineering Product

Produce production plans

Manufacturing to a production plan, which is related to the production of a “one-off” or limited batch production of an engineering product

Using tools and equipment

Understanding the reasons for the selection and use of specified materials, components, processes, tools and equipment

Working safely

Identification of Health and Safety issues including the use of Personal Protective Equipment

Quality issues – tolerances and using accurate measurement systems

Planning and organisation – organising the work, planning sequences of operations

Analyse and revise the completed project, taking into account how it could be improved

Engineering Processes

Including material removal, shaping and manipulation, joining and assembly, heat and chemical treatment and surface finishing including the following

Machining operations

Turning

Milling or routing

Drilling

Cutting

e.g. sawing, shearing

shaping

casting

forming

bending or vacuum forming

joining

Rivet, threaded fasteners, welding and soldering

Surface finishing

Painting, plating, surface finishing

Application of New Technologies

CNC cutting limited to two axes, e.g. vinyl or laser cutters, drilling or profile cutting or milling Printed Circuit Board.

Impact of Modern Technologies

Describe the impact of modern technologies:

- when engineering a product
- on engineered products
- on engineering industries
- on the stages of engineering a product.

Describe the advantages and disadvantages that the use of modern technology has brought to society, including environmental issues and sustainability.

Investigate a range of engineered products to determine the impact of modern technology on design and production methods.

3.2 Unit 2 Designing, Communicating and Manufacturing

This unit is a compulsory Controlled Assessment unit. This is a practically based unit where knowledge of the Unit 1 subject content is applied to the design and making of projects.

The Assessment Criteria for Unit 2 Controlled Assessment are given below. AQA will provide exemplar material and detailed guidance to illustrate the standard of work required for this coursework unit.

AQA will issue a number of Controlled Assessment Tasks

Each task will be divided into two parts:

- Part A: Completing an AQA specified design task
- Part B: Completing an AQA specified making task

This may involve either completing a making task following the design completed in Part A; **or** a separate, different making task taken from the

list of tasks provided by AQA for Part B. If the *centre* is providing candidates with the drawings for Part B then the task must not be related to Part A.

Single Award candidates' work will be marked out of a total of 90 marks.

Five criteria are produced for assessment and each criterion has 3 bands of marks. Each band should be viewed holistically when making assessments; a weakness in one element of a level, for example, can be balanced by strengths in another. Candidates who produce no work for a criterion, or who produce work below GCSE standard, should be awarded a mark of zero.

Controlled assessment advisers will be available to provide guidance to centres.

Unit 2	Mark Band 1 At this level candidates have	Mark range	Mark Band 2 At this level candidates have	Mark range	Mark Band 3 At this level candidates have	Mark range
When designing	Produced a brief analysis, identifying some features of the design brief, to produce a design specification.	0–1	Produced a more detailed analysis, identifying most of the key features and client requirements.	2–3	Produced a detailed analysis explaining the client's requirements and justifying the key features.	4–5
	Generated and evaluated a basic design idea and developed a simple design solution. There is some sign of modification.	0–3	Generated and evaluated alternative design ideas with evidence of testing and modifications to produce a final design solution.	4–6	Generated and evaluated a range of alternative design ideas. There is detailed evidence of testing and modifications to produce a final design solution.	7–9
When communicating	Used a limited range of engineering drawings/ diagrams. They may not be drawn to sector-specific standards and conventions. Some of the information is presented in an appropriate form and/or style. Much of the work is not organised clearly or coherently. Numerous errors in grammar, punctuation and spelling are evident in the work.	0–4	Used a range of engineering drawings/diagrams. There is some evidence that they have used sector-specific standards and conventions. It is unclear from the drawings that the ideas are workable. Most of the information is presented in an appropriate form and style. Most of the work is organised clearly and coherently. There are a small number of errors in grammar, punctuation and spelling evident in the work.	5–8	Used a range of detailed engineering drawings/ diagrams that comply with sector specific standards and conventions. The ideas are workable and the drawings/ diagrams are annotated appropriately. Information is clearly and logically presented and organised using an appropriate form and style throughout. The text is legible, easily understood and shows a good grasp of grammar, punctuation and spelling in the work.	9–12

When testing and evaluating	Demonstrated limited evidence of testing against the design brief and specification.	0-2	Demonstrated testing against the design brief and specification, with evidence of some use of scientific principles and/or modelling being applied and some link to the final design being evident.	3-4	Demonstrated testing against the design brief and specification, using appropriate scientific principles and modelling, to select their final design.	5-6
	Shown some reasoning and have used basic or inappropriate terminology. They did not respond to feedback or modify their proposed solution	0-1	Explained the reasons for their choice using appropriate technical language. The final design solution matches the main design criteria. Candidates have responded to client feedback and modified their proposed solution if necessary.	2-3	Explained in detail the reasons for their choice using correct engineering and technical language. The final design solution matches the design criteria. Candidates have responded to client feedback and proposed modifications to the specification as required.	4-5
Unit 2 Part B						
When making	Produced a simple production plan using the basic information in the product specification.	0-1	Produced a production plan using the information contained within the product specification.	2-3	Produced a comprehensive production plan using fully all aspects of the product specification.	4-5
	Followed a simple production plan using information contained in engineering drawings and/or diagrams.	0-1	Followed a production plan using information contained in engineering drawings and/or diagrams.	2-3	Followed a comprehensive production plan using information contained in engineering drawings and/or diagrams.	4-5
	Selected and used safely, with guidance, materials, parts and components for their product.	0-1	Selected and used safely, with limited guidance, the correct materials, parts and components for their product.	2-3	Independently selected and used safely appropriate materials, parts and components for their product. An explanation is given as to why alternative materials, parts and/or components which could have been used/ tested were not.	4-5
Subtotal						/37

Unit 2	Mark Band 1 At this level candidates have	Mark range	Mark Band 2 At this level candidates have	Mark range	Mark Band 3 At this level candidates have	Mark range
Unit 2 Part B						
	Used, with guidance, appropriate processes, tools and equipment to make their product. They have worked safely with some skill.	0–6	Selected and used, with limited guidance, appropriate processes, tools and equipment to make their product. They have worked safely and competently.	7–12	Independently selected and used processes, tools and equipment to make their product. They have worked safely, competently and effectively. An explanation is given as to why alternative processes, tools and equipment could have been used/tested if necessary.	13–18
	Undertaken some testing of the product and compared it to the product specification.	0–1	Undertaken a range of basic testing on the product and compared it to the product specification. The finished product complies with the main requirements of the specification.	2–3	Undertaken detailed and objective testing to compare their product to the specification. The finished product complies consistently with the standards required.	4–5
					Subtotal	/38
When applying new technologies in Parts A and B	Described a single aspect of a new technology including superficially investigated engineering products.	0–2	Described several aspects of new technology including investigated an engineering product in some detail.	3–4	Described the impact of a wide range of new technologies including critically investigating several engineering products.	5–6
	Described how a CNC operation could be carried out	0–3	Described how several CNC operations could be carried out.	4–6	Described and carried out several CNC operations.	7–9
					Subtotal	/15
					Total	/90

3.3 Unit 3 Application of Technology

This unit provides details of the subject content that will be required to be covered by candidates at Double Award. Candidates are required to use the knowledge and understanding stated in the Unit 3 examination and in the completion of their Controlled Assessment in Unit 4. Candidates taking the Double Award must also have covered all of the content as outlined in Unit 1 above. Additional information required for the Double Award may be found below. Candidates completing Controlled Assessment for the Double Award Unit 4 must also demonstrate knowledge and understanding of the additional information below.

The content has been divided into two sections:

Application of technologies
Manufacturing Systems

Application of Technologies

Design specification

Testing and evaluating against the design specification using objective methods.

Drawing techniques

Assembly or exploded diagrams
Circuit diagrams
Systems diagrams and flowcharts
Drawings which conform to current standards

Computer Aided Design

Rendered presentation drawings

Manufacturing Systems

Manufacturing to a production plan, including understanding of large batch and continuous production

Using tools and equipment

Using automated systems

Understanding the reasons for the selection of specified materials and components

Health and safety

Quality issues – tolerances – quality control, including using go/no go gauges, quality assurance

Planning and organisation – organising the work, planning sequences of operations, preparing production plans

Processes

Bending

Surface finishing

Anodising, galvanising, polishing

Application of Technologies

CNC, including an understanding of x, y, z co-ordinates

Computer Integrated Manufacturing, Computer Integrated Engineering

Microcontrollers and industrial control systems

Robotic systems

New and “smart” materials

Environmental and waste disposal issues

Energy sources, renewable and non-renewable

Energy use in manufacturing

3.4 Unit 4 Developing Design and Manufacturing Products

This unit is a compulsory Controlled Assessment unit. This is a practically based unit where knowledge of the Unit 3 subject content is applied to the design and making of projects. The Controlled Assessment unit will focus upon the application of manufacturing systems for the production of a working product.

The Assessment Criteria for Unit 4 Controlled Assessment are given below. AQA will provide exemplar material and detailed guidance to illustrate the standard of work required for this coursework unit.

AQA will issue a number of Controlled Assessment Tasks.

Each task will be divided into two parts:

- Part A: Completing an AQA specified design task
- Part B: Completing an AQA specified making task

This may involve either completing a making task following the design completed in Part A; **or** a separate, different making task taken from the list of tasks provided by AQA for Part B. If the *centre* is providing candidates with the drawings for Part B then the task must not be related to Part A.

Double Award candidates' work will be marked out of a total of 90 marks.

Five criteria are produced for assessment and each criterion has 3 bands of marks. Each band should be viewed holistically when making assessments; a weakness in one element of a level, for example, can be balanced by strengths in another. Candidates who produce no work for a criterion, or who produce work below GCSE standard, should be awarded a mark of zero.

Unit 4 Part A	Mark Band 1 At this level candidates have	Mark range	Mark Band 2 At this level candidates have	Mark Range	Mark Band 3 At this level candidates have	Mark range
When designing	Produced a brief analysis identifying some features of the design brief to produce a design specification. Simply analysed energy requirements.	0–1	Produced a more detailed analysis identifying most of the key features and client requirements, including the energy used by the product or during manufacture.	2–3	Produced a detailed analysis explaining the clients requirements and justifying the key features, including the energy demands of the product and manufacturing processes.	4–5
	Generated and evaluated a basic design idea and developed a simple design solution. There is some sign of modification.	0–3	Generated and evaluated alternative design ideas with evidence of testing and modifications to produce a final design solution.	4–6	Generated and evaluated a range of alternative design ideas. There is detailed evidence of testing using objective methods and modifications to produce a final design solution.	7–9
When communicating	Used a limited range of engineering drawings/diagrams. They may not be drawn to sector-specific standards and conventions. Some CAD has been attempted. Some of the information is presented in an appropriate form and/or style. Much of the work is not organised clearly or coherently. Numerous errors in grammar, punctuation and spelling are evident in the work.	0–4	Used a range of engineering drawings/diagrams including CAD for presentation. There is some evidence that they have used sector-specific standards and conventions. It is clear from the drawings that the ideas are workable. Most of the information is presented in an appropriate form and style. Most of the work is organised clearly and coherently. There are a small number of errors in grammar, punctuation and spelling evident in the work.	5–8	Used a range of detailed engineering drawings/diagrams that comply with sector specific standards and conventions. The ideas are workable and the drawings/diagrams are annotated appropriately. CAD has been used with effect to produce rendered presentations. Information is clearly and logically presented and organised using an appropriate form and style throughout. The text is legible, easily understood and shows a good grasp of grammar, punctuation and spelling in the work.	9–12

When testing and evaluating	Demonstrated limited evidence of testing against the design brief and specification.	0-2	Demonstrated some evidence of testing against the design brief and specification using objective methods.	3-4	Demonstrated testing against the design brief and specification, using objective methods, appropriate scientific principles and modelling, to select their final design.	5-6
	Shown some reasoning and have used basic or inappropriate terminology. They did not respond to feedback or modify their proposed solution	0-1	Explained the reasons for their choice using appropriate technical language. The final design solution matches the main design criteria. Candidates have responded to client feedback and modified their proposed solution if necessary.	2-3	Explained in detail the reasons for their choice using correct engineering and technical language. The final design solution matches the design criteria. Candidates have responded to client feedback and proposed modifications to the specification as required.	4-5
					Subtotal	/37
Unit 4 Part B						
When making	Produced a simple production plan using the basic information in the product specification suitable for one-off production.	0-1	Produced a production plan using the information contained within the product specification. Included some reference to batch production	2-3	Produced a comprehensive production plan using fully all aspects of the product specification. Shown understanding of batch and continuous production procedures.	4-5
	Followed a simple production plan using information contained in engineering drawings and/or diagrams.	0-1	Followed a production plan suitable for batch production using information contained in engineering drawings and/or diagrams.	2-3	Followed a comprehensive production plan suitable for batch and continuous production using information contained in engineering drawings and/or diagrams.	4-5

Unit 4 Part A	Mark Band 1 At this level candidates have	Mark range	Mark Band 2 At this level candidates have	Mark range	Mark Band 3 At this level candidates have	Mark range
Unit 4 Part B						
	Selected and used safely, with guidance, materials, parts and components for their product.	0–1	Selected and used safely, with limited guidance, the correct materials, parts and components for their product.	2–3	Independently selected and used safely appropriate materials, parts and components for their product. An explanation is given as to why alternative materials, parts and/or components which could have been used/ tested were not.	4–5
	Used, with guidance, appropriate processes, tools and equipment to make their product. They have worked safely with some skill.	0–6	Selected and used, with limited guidance, appropriate processes, tools and equipment to make their product. They have worked safely and competently.	7–12	Independently selected and used processes, tools and equipment to make their product. They have worked safely, competently and effectively. An explanation is given as to why alternative processes, tools and equipment could have been used/ tested if necessary.	13–18
	Undertaken some testing of the product and compared it to the product specification. Shown an awareness of quality issues.	0–1	Undertaken a range of basic testing on the product and compared it to the product specification. The finished product complies with the main requirements of the specification. Quality is maintained and work is in tolerance.	2–3	Undertaken detailed and objective testing to compare their product to the specification. The finished product complies consistently with the standards required. Quality control methods suitable for quantity production are used as part of quality assurance.	4–5
					Subtotal	/38

When applying new technologies in Parts A and B	Described limited aspects of new technology including CIM and CIE. Considered the use of smart materials. Superficially investigated microcontrollers and control systems.	0-2	Described several aspects of applying new technology such as CIM and CIE including the use of microcontrollers and control systems. Investigated how smart materials could be used.	3-4	Described the impact of a wide range of new technologies in manufacturing and control systems. Described the use of a CIM or CIE operation with some detail. Demonstrated the application of a smart material.	5-6
	Described how an automated / robotic operation could be carried out.	0-3	Described how several automated/robotic operations could be carried out.	4-6	Described and carried out several automated / robotic operations.	7-9
					Subtotal	/15
					Total	/90

Level of control

Within the controlled assessment component, levels of control are defined for the following three stages of assessment:

- task setting
- task taking
- task marking

Task setting

Students are required to submit a single design and make project which should be selected from a list of tasks provided by AQA at the start of the academic year. These tasks are broadly comparable and students can only submit a project which has been selected from this list. In certain situations it may be appropriate for centres to contextualise a given task in order to best suit their centre specific circumstances. In such a situation the centre should contact the controlled assessment adviser allocated to their centre in order to seek guidance.

The list of board set tasks will be reviewed every two years and amended/added to as appropriate.

Task taking

Authenticity control – research and preparation may be completed under limited supervision. However, all work, with the exception of research and preparation, should be completed by students under informal supervision. This means that the centre must ensure that plagiarism does not take place, that sources used by students are clearly recorded and that each students' preparation for the final production of the work is his/her own.

Feedback control – teachers may review students' work and may provide advice at a general level. Teachers, however, must not provide detailed and specific advice on how the draft may be improved to meet the assessment criteria. The nature of any guidance provided and the details of any

feedback given must be clearly recorded. Students may be guided as to the approach they might adopt but the outcome must remain their own. Likewise, feedback may evaluate progress to date and propose suggested broad approaches for improvement but the detailed correction or annotation of work for feedback purposes is not allowed.

Time control – each student should produce a design folder (paper or electronic) and a completed outcome. It is expected that the total activity should take approximately 45 hours to complete, including preparation but not including additional time for the teaching and learning of the subject content. We are keen to encourage succinctness and a focussed approach to this task and for this reason it is expected that the design folder should consist of approximately 20 pages of A3 paper (or the A4 or electronic equivalent). Examinations Officers should contact AQA Candidate Services for advice on any students who may need special consideration and, therefore, may require additional time.

Collaboration control – the work of individual students may be informed by working with others, for example when undertaking research, but students must provide an individual response in the task outcome.

Resources – students' access to resources is likely to be determined by the availability in centres. Examinations Officers should contact AQA Candidate Services for advice on any students who may require the use of any special equipment.

Task marking

Teachers should mark the controlled assessment using the assessment criteria given above in Units 2 and 4. Further details regarding this process are given in section 6. Moderation of the controlled assessment work is by inspection of a sample of students' work sent by post or electronically through the e-Portfolio system from the centre to a moderator appointed by AQA. Further details are provided in section 7.

4 Scheme of Assessment

4.1 Aims and learning outcomes

GCSE courses based on this specification should encourage candidates to: be inspired, moved and changed by following a broad, coherent, satisfying and worthwhile course of study and gain an insight into related sectors, such as manufacturing. They should prepare learners to make informed choices about further learning opportunities and career choices.

All specifications in engineering must enable learners to:

- actively engage in the processes of engineering to develop as effective and independent learners
- understand the contribution that engineering makes to society and the economy
- develop an awareness and appreciation of commercial and industry issues and emerging technologies in the context of engineering
- develop and use a range of transferable skills when designing and making engineered products, to enable them to become effective and independent learners
- develop an awareness and understanding of environmental issues and sustainable development
- develop applied engineering skills as a foundation for future learning and progression
- apply their knowledge and understanding of engineering by using skills of evaluation and problem-solving

4.2 Assessment Objectives (AOs)

The assessment units will assess the following assessment objectives in the context of the content and skills set out in Section 3 (Subject Content).

- AO1** Recall, select and communicate knowledge and understanding of a range of contexts
- AO2** Apply skills, knowledge and understanding, including quality standards, in a variety of contexts and to plan and carry out investigations and tasks, involving a range of tools, equipment, materials and components
- AO3** Analyse and evaluate evidence, make reasoned judgements and present conclusions

Quality of Written Communication (QWC)

GCSE specifications which require candidates to produce written material in English must:

- ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear;
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

In this specification QWC will be assessed in the Controlled Assessment and the examinations. The criteria give further information on marks to be awarded.

Weighting of Assessment Objectives for GCSE Single Award

The table below shows the approximate weighting of each of the Assessment Objectives in the GCSE Engineering units.

Assessment Objectives	Unit Weightings (%)		Overall Weighting of AOs (%)
	Unit 1	Unit 2	
AO1	20	10	30
AO2	15	40	55
AO3	5	10	15
Overall weighting of units (%)	40	60	100

Weighting of Assessment Objectives for GCSE Double Award

The table below shows the approximate weighting of each of the Assessment Objectives in the GCSE Engineering units.

Assessment Objectives	Unit Weightings (%)				Overall Weighting of AOs (%)
	Unit 1	Unit 2	Unit 3	Unit 4	
AO1	10	5	10	5	30
AO2	7.5	20	7.5	20	55
AO3	2.5	5	2.5	5	15
Overall weighting of units (%)	20	30	20	30	100

4.3 National criteria

This specification complies with the following.

- The Subject Criteria for Engineering including the rules for Controlled Assessment
- Code of Practice
- The GCSE Qualification Criteria
- The Arrangements for the Statutory Regulation of External Qualifications in England, Wales and Northern Ireland: Common Criteria
- The requirements for qualifications to provide access to Levels 1 and 2 of the National Qualification Framework.

4.4 Prior learning

There are no prior learning requirements.

However, any requirements set for entry to a course following this specification are at the discretion of centres.

4.5 Access to assessment: diversity and inclusion

GCSEs often require assessment of a broader range of competences. This is because they are general qualifications and, as such, prepare candidates for a wide range of occupations and higher level courses.

The revised GCSE qualification and subject criteria were reviewed to identify whether any of the competences required by the subject presented a potential barrier to any candidates regardless of their ethnic origin, religion, gender, age, disability or sexual orientation. If this was the case, the situation was

reviewed again to ensure such competences were included only where essential to the subject. The findings of this process were discussed with groups who represented the interests of a diverse range of candidates.

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments. For this reason, no candidates will have a barrier to any part of the assessment. Further details are given in section 5.4.

5 Administration

5.1 Availability of assessment units and certification

Examinations and certification for this specification are available as follows:

	Availability of units				Availability of certification	
	Unit 1	Unit 2	Unit 3	Unit 4	Single Award	Double Award
June 2012	✓	✓	✓	✓	✓	✓
Jan 2013						
June 2013	✓	✓	✓	✓	✓	✓
Jan 2014						
June 2014	✓	✓	✓	✓	✓	✓

Ofqual's revisions to the Code of Practice mean that from June 2014: assessments (both external assessments and moderation of controlled

assessment) will only be available once a year in June with 100% of the assessment being taken in the examination series in which the qualification is awarded.

5.2 Entries

Please refer to the current version of *Entry Procedures and Codes* for up to date entry procedures. You should use the following entry codes for the units and for certification.

Unit 1 – 48501
 Unit 2 – 48502
 Unit 3 – 48503
 Unit 4 – 48504

GCSE certification
 GCSE Single Award 4852
 GCSE Double Award 4854

Candidates have to enter all the assessment units at the end of the course, at the same time as they enter for the subject award.

5

5.3 Private candidates

This specification is not available to private candidates.

5.4 Access arrangements and special consideration

We have taken note of equality and discrimination legislation and the interests of minority groups in developing and administering this specification.

We follow the guidelines in the Joint Council for Qualifications (JCQ) document: *Access Arrangements, Reasonable Adjustments and Special Consideration: General and Vocational Qualifications*. This is published on the JCQ website (<http://www.jcq.org.uk>) or you can follow the link from our website (<http://www.aqa.org.uk>).

Access arrangements

We can make arrangements so that candidates with special needs can access the assessment. These arrangements must be made **before** the examination. For example, we can produce a Braille paper for a candidate with a visual impairment.

Special consideration

We can give special consideration to candidates who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given **after** the examination.

Applications for access arrangements and special consideration should be submitted to AQA by the Examinations Officer at the centre.

5.5 Language of examinations

We will provide units for this specification in English only

5.6 Qualification titles

Qualifications based on this specification are:

- AQA GCSE Single Award in Engineering,
- AQA GCSE Double Award in Engineering.

5.7 Awarding grades and reporting results

The GCSE and GCSE short course qualifications will be graded on an eight-grade scale: A*, A, B, C, D, E, F and G. Candidates who fail to reach the minimum standard for grade G will be recorded as U (unclassified) and will not receive a qualification certificate.

The GCSE Double Award qualification will be graded on a fifteen grade scale: A*A*, A*A, AA, AB, BB, BC, CC, CD, DD, DE, EE, EF, FF, FG, GG. Candidates

who fail to reach the minimum standard for grade GG will be recorded as U (unclassified) and will not receive a qualification certificate.

We will publish the minimum raw mark for each grade, for each unit, when we issue candidates' results. We will report a candidate's unit results to centres in terms of uniform marks and qualification results in terms of uniform marks and grades.

For each unit, the uniform mark corresponds to a grade as follows.

Unit 1 (written paper)

(maximum uniform mark = 80)

Grade	Uniform Mark Range
A*	72–80
A	64–71
B	56–63
C	48–55
D	40–47
E	32–39
F	24–31
G	16–23
U	0–15

Unit 3 (written paper)

(maximum uniform mark = 80)

Grade	Uniform Mark Range
A*	72–80
A	64–71
B	56–63
C	48–55
D	40–47
E	32–39
F	24–31
G	16–23
U	0–15

Unit 2 (controlled assessment)

(maximum uniform mark = 120)

Grade	Uniform Mark Range
A*	108–120
A	96–107
B	84–95
C	72–83
D	60–71
E	48–59
F	36–47
G	24–35
U	0–23

Unit 4 (controlled assessment)

(maximum uniform mark = 120)

Grade	Uniform Mark Range
A*	108–120
A	96–107
B	84–95
C	72–83
D	60–71
E	48–59
F	36–47
G	24–35
U	0–23

We calculate a candidate's total uniform mark by adding together the uniform marks for the relevant units. We convert this total uniform mark to a grade as follows.

Single award

(maximum uniform mark = 200)

Grade	Uniform Mark Range
A*	180–200
A	160–179
B	140–159
C	120–139
D	100–119
E	80–99
F	60–79
G	40–59
U	0–39

Double award

(maximum uniform mark = 400)

Grade	Uniform Mark Range
A*A*	360–400
A*A	340–359
AA	320–339
AB	300–319
BB	280–299
BC	260–279
CC	240–259
CD	220–239
DD	200–219
DE	180–199
EE	160–179
EF	140–159
FF	120–139
FG	100–119
GG	80–99
U	0–79

5.8 Examination series

Candidates have to enter all the assessment units at the end of the course, at the same time as they enter for the subject award.

As a consequence of the move to linear assessment, candidates will be allowed to carry forward their controlled assessment unit result(s) following the initial moderation and aggregation during the lifetime of the specification.

Candidates will be allowed to carry forward unit results where those units have already been used to aggregate to a GCSE single award and a candidate wishes to re-use the unit result to aggregate to a double award in the same subject.

6 Controlled Assessment Administration

The Head of Centre is responsible to AQA for ensuring that controlled assessment work is conducted in accordance with AQA's instructions and JCQ instructions.

6.1 Authentication of controlled assessment work

In order to meet the requirements of Code of Practice AQA requires:

- **candidates** to sign the Candidate Record Form to confirm that the work submitted is their own
- **teachers/assessors** to confirm on the Candidate Record Form that the work assessed is solely that of the candidate concerned and was conducted under the conditions laid down by the specification.
- **centres** to record marks of zero if candidates cannot confirm the authenticity of work submitted for assessment.

The completed Candidate Record Form for each candidate should be attached to his/her work. All teachers who have assessed the work of any candidate entered for each component must sign the declaration of authentication.

If teachers/assessors have reservations about signing the authentication statements, the following points of guidance should be followed.

- If it is believed that a candidate has received additional assistance and this is acceptable within the guidelines for the relevant specification, the teacher/assessor should award a mark which represents the candidate's unaided achievement. The authentication statement should be signed and information given on the relevant form.
- If the teacher/assessor is unable to sign the authentication statement for a particular candidate, then the candidate's work cannot be accepted for assessment.

If, during the external moderation process, there is no evidence that the work has been properly authenticated, AQA will set the associated mark(s) to zero.

6.2 Malpractice

Teachers should inform candidates of the AQA Regulations concerning malpractice.

Candidates must **not**:

- submit work which is not their own;
- lend work to other candidates;
- allow other candidates access to, or the use of, their own independently sourced source material (this does not mean that candidates may not lend their books to another candidate, but candidates should be prevented from plagiarising other candidates' research);
- include work copied directly from books, the internet or other sources without acknowledgement and attribution;
- submit work typed or word-processed by a third person without acknowledgement.

These actions constitute malpractice, for which a penalty (for example disqualification from the examination) will be applied.

If malpractice is suspected, the Examinations Officer should be consulted about the procedure to be followed.

Where suspected malpractice in controlled assessments is identified by a centre after the candidate has signed the declaration of authentication, the Head of Centre must submit full details of the case to AQA at the earliest opportunity. The form JCQ/M1 should be used. Copies of the form can be found on the JCQ website (<http://www.jcq.org.uk/>).

Malpractice in controlled assessments discovered prior to the candidate signing the declaration of authentication need not be reported to AQA, but should be dealt with in accordance with the centre's internal procedures. AQA would expect centres to treat such cases very seriously. Details of any work which is not the candidate's own must be recorded on the Candidate Record Form or other appropriate place.

6.3 Teacher standardisation

AQA will hold annual standardising meetings for teachers, usually in the autumn term, for controlled assessment. At these meeting we will provide support in contextualising the tasks and using the marking criteria.

If your centre is new to this specification, you must send a representative to one of the meetings. If you have told us you are a new centre, either by submitting an intention to enter and/or an estimate of entry or by contacting the subject team, we will contact you to invite you to a meeting.

AQA will also contact centres if:

- the moderation of controlled assessment work from the previous year has identified a serious misinterpretation of the controlled assessment requirements, *or*
- a significant adjustment has been made to a centre's marks.

In these cases, centres will be expected to send a representative to one of the meetings. For all other centres, attendance is optional. If a centre is unable to attend and would like a copy of the written materials used at the meeting, they should contact the subject administration team at **engineering@aqa.org.uk**

It is likely that during the lifetime of this specification AQA will move to **online teacher standardisation**.

6.4 Internal standardisation of marking

Centres must standardise marking to make sure that all candidates at the centre have been marked to the same standard. One person must be responsible for internal standardisation. This person should sign the Centre Declaration Sheet to confirm that internal standardisation has taken place.

Internal standardisation may involve:

- all teachers marking some trial pieces of work and identifying differences in marking standards;
- discussing any differences in marking at a training meeting for all teachers involved in the assessment;
- referring to reference and archive material such as previous work or examples from AQA's teacher standardising meetings.

6.5 Annotation of controlled assessment work

The Code of Practice states that the awarding body must require internal assessors to show clearly how the marks have been awarded in relation to the marking criteria defined in the specification and that the awarding body must provide guidance on how this is to be done.

The annotation will help the moderator to see as precisely as possible where the teacher considers that the candidates have met the criteria in the specification.

Work could be annotated by either of the following methods:

- key pieces of evidence flagged throughout the work by annotation either in the margin or in the text;
- summative comments on the work, referencing precise sections in the work.

6.6 Submitting marks and sample work for moderation

The total mark for each candidate must be submitted to AQA and the moderator on the mark forms provided, by Electronic Data Interchange (EDI) or through the e-Portfolio system (only available for certain units/components) by the specified date (see

<http://www.aqa.org.uk/deadlines.php>).

Centres will normally be notified which candidates' work is required in the sample to be submitted to the moderator (please refer to section 7.1 for further guidance on submitting samples).

6.7 Factors affecting individual candidates

Teachers should be able to accommodate the occasional absence of candidates by ensuring that the opportunity is given for them to make up missed controlled assessments.

If work is lost, AQA should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form JCQ/LCW to inform AQA Centre and Candidate Support Services of the circumstances.

Where special help which goes beyond normal learning support is given, AQA must be informed through comments on the Candidate Record Form so that such help can be taken into account when moderation takes place.

Candidates who move from one centre to another during the course sometimes present a problem for a scheme of controlled assessment work. Possible courses of action depend on the stage at which the move takes place. If the move occurs early in the course the new centre should take responsibility for controlled assessment work. If it occurs late in the course it may be possible to arrange for the moderator to assess the work through the 'Educated Elsewhere' procedure. Centres should contact AQA at the earliest possible stage for advice about appropriate arrangements in individual cases.

6.8 Retaining evidence

The centre must retain the work of all candidates, with Candidate Record Forms attached, under secure conditions, from the time it is assessed, to allow for the possibility of an enquiry about results. The work

may be returned to candidates after the deadline for enquiries about results. If an enquiry about a result has been made, the work must remain under secure conditions in case it is required by AQA.

7 Moderation

7.1 Moderation procedures

Moderation of the controlled assessment work is by inspection of a sample of candidates' work, sent by post or electronically through the e-Portfolio system from the centre to a moderator appointed by AQA. The centre marks must be submitted to AQA and to the moderator by the specified deadline (see <http://www.aqa.org.uk/deadlines.php>).

Centres entering fewer candidates than the minimum sample size and centres submitting through the e-Portfolio system should submit the work of all of their candidates. Centres entering larger numbers of candidates will be notified of the candidates whose work will be required in the sample to be submitted for moderation.

Following the re-marking of the sample work, the moderator's marks are compared with the centre marks to determine whether any adjustment is needed in order to bring the centre's assessments into line with standards generally. In some cases it may be necessary for the moderator to call for the work of additional candidates in the centre. In order to meet this possible request, centres must retain under secure conditions and have available the controlled assessment work and Candidate Record Forms of every candidate entered for the examination and be prepared to submit it on demand. Mark adjustments will normally preserve the centre's order of merit, but where major discrepancies are found, AQA reserves the right to alter the order of merit.

7.2 Consortium arrangements

If there are a consortium of centres with joint teaching arrangements (i.e. where candidates from different centres have been taught together but where they are entered through the centre at which they are on roll), the centres must inform AQA by completing the JCQ/CCA form.

The centres concerned must nominate a consortium co-ordinator who undertakes to liaise with AQA on

behalf of all centres in the consortium. If there are different co-ordinators for different specifications, a copy of the JCQ/CCA form must be submitted for each specification.

AQA will allocate the same moderator to each centre in the consortium and the candidates will be treated as a single group for the purpose of moderation.

7.3 Post-moderation procedures

On publication of the results, we will provide centres with details of the final marks for the controlled assessment work.

The candidates' work will be returned to the centre after the examination. The centre will receive a report,

at the time results are issued, giving feedback on the accuracy of the assessments made, and the reasons for any adjustments to the marks.

We may retain some candidates' work for awarding, archive or standardising purposes.

Appendices

A Grade Descriptions

Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded particular grades. The descriptions should be interpreted in relation to the content outlined in the specification; they are not designed to define that content.

The grade awarded will depend in practice upon the extent to which the candidate has met the assessment objectives (see Section 4) overall. Shortcomings in some aspects of the candidates' performance may be balanced by better performances in others.

Grade	Description
A	<p>Candidates recall, select and communicate detailed knowledge and thorough understanding of engineering.</p> <p>They apply relevant knowledge, understanding and skills in a range of situations to plan and carry out investigations and tasks effectively. They test their solutions, working safely and with a high degree of precision.</p> <p>They analyse and evaluate the evidence available, reviewing and adapting their methods when necessary. They present information clearly and accurately, making reasoned judgements and presenting substantiated conclusions.</p>
C	<p>Candidates recall, select and communicate sound knowledge and understanding of engineering.</p> <p>They apply knowledge, understanding and skills in a range of situations to plan and carry out investigations and tasks. They test their solutions, working safely and with precision.</p> <p>They review the evidence available, analysing and evaluating some information clearly and with some accuracy. They make judgements and draw appropriate conclusions.</p>
F	<p>Candidates recall, select and communicate knowledge and understanding of basic aspects of engineering.</p> <p>They apply limited knowledge, understanding and skills to plan and carry out simple investigations and tasks, with an awareness of the need for safety and precision. They modify their approach in the light of progress.</p> <p>They review their evidence and draw basic conclusions.</p>

B Spiritual, Moral, Ethical, Social, Legislative, Sustainable Development, Economic and Cultural Issues, and Health and Safety Considerations

AQA has taken great care to ensure that any wider issues, including those particularly relevant to the education of students at Key Stage 4, have been identified and taken into account in the preparation of this specification. They will only form part of the assessment requirements where they relate directly to the specific content of the specification and have been identified in Section 3: Content.

European Dimension

AQA has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen units.

Environmental Education

AQA has taken account of the 1988 Resolution of the Council of the European Community and the Report “Environmental Responsibility: An Agenda for Further and Higher Education” 1993 in preparing this specification and associated specimen units.

Avoidance of Bias

AQA has taken great care in the preparation of this specification and specimen units to avoid bias of any kind.

C Overlaps with other Qualifications

There is some overlap with the GCSE in Design and Technology (full and short courses); however, the teaching, learning and assessment styles are different.

D Wider Key Skills

The replacement of Key Skills with Functional Skills

The Key Skills qualifications have been replaced by the **Functional Skills**. However, centres may claim proxies for Key Skills components and/or certification in the following series: January, March and June 2012. The **Administration Handbook for the Key Skills Standards 2012** has further details. All Examination Officers in centres offering AQA Key Skills and Wider Key Skills have been sent a letter outlining the details of the end dates of these subjects. Copies of the letters have also been sent to the Head of Centre and Key Skills coordinator. This is a brief outline of that information. It is correct as at August 2011 and replaces the information on the same subject found in other documents on the AQA website:

- **Key Skills Levels 1, 2 and 3 Test and Portfolio**
The final opportunity for candidates to enter for a level 1, 2 or 3 Key Skills test or portfolio was June 2011 with the last certification in 2012.
- **Key Skills Level 4** The last series available to candidates entering for the Key Skills Level 4 test and portfolio was June 2010 with the last certification in the June series 2012.
- **Basic Skills Adult Literacy Levels 1 and 2, Adult Numeracy Levels 1 and 2** AQA Basic Skills qualifications will now be available until, at least, the June 2012 series.

Funding

We have received the following advice on the funding of learners undertaking these qualifications:

- Currently the **Skills Funding Agency** funds Basic Skills in literacy and numeracy for adult, 19 plus, learners only. There are various support funds for learners aged 16-18 administered by the **Young People's Learning Agency (YPLA)**. These include EMA (until the end of the 2010/11 academic year), Care to Learn and discretionary learner support hardship funding for learners living away from home.
- This information is correct at the time of publication. If you would like to check the funding provision post-June 2011, please call the **Skills Funding Agency** helpdesk on 0845 377 5000.
- **Wider Key Skills** The AQA Wider Key Skills qualifications are no longer available. The last portfolio moderation took place in June 2011.

Further updates to this information will be posted on the website as it becomes available.

http://web.aqa.org.uk/qual/keyskills/wider_noticeboard.php



GCSE Engineering and Engineering (Double Award) Teaching from September 2012 onwards

Qualification Accreditation Number: 500/4600/7 and 500/4489/8 (Double Award)

Every specification is assigned a national classification code indicating the subject area to which it belongs. The classification code for this specification is 0009.

Centres should be aware that candidates who enter for more than one GCSE qualification with the same classification code will have only one grade (the highest) counted for the purpose of the School and College Performance Tables.

Centres may wish to advise candidates that, if they take two specifications with the same classification code, schools and colleges are very likely to take the view that they have achieved only one of the two GCSEs. The same view may be taken if candidates take two GCSE specifications that have different classification codes but have significant overlap of content. Candidates who have any doubts about their subject combinations should check with the institution to which they wish to progress before embarking on their programmes.

To obtain free specification updates and support material or to ask us a question register with Ask AQA:

www.aqa.org.uk/ask-aqa/register

Support meetings are available throughout the life of the specification.

Further information is available at:

<http://events.aqa.org.uk/ebooking>

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