OCR
RECOGNISING ACHIEVEMENT

GCSE

Applied Engineering (Double Award)
Applied Manufacturing (Double Award)

General Certificate of Secondary Education **GCSE 1492**
General Certificate of Secondary Education **GCSE 1496**

Combined Mark Schemes And Report on the Units

June 2005

1492/1496/MS/R/05

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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General Certificate of Secondary Education

Applied GCSE (Double Award) Engineering (1492)
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MARK SCHEMES FOR THE UNITS

REPORT ON THE UNITS

Mark Scheme 4868/4880
June 2005

1 (a) Either column shown is acceptable.

Assembly and finishing	**5**	**5**
Material supply and control	**2**	**3**
Packaging and dispatch	**6**	**6**
Design		
Processing - production	**4**	**4**
Production planning	**3**	**2**

[5]

(b) One mark for each activity appropriate to the stage of engineering or manufacturing. Examples:

(i) NOT (designing the product)

- CAD to design
- CAD to develop design
- planning
- Writing
- Draw design availability
- Check mater
- Mood board
- Specification
- Research
- Emailing ideas
- Analysing research
- Materials/components available are checked (NOT materials in stock)
- making a prototype
- Seeking users' views 2 x 1 **[2]**

(ii) NOT Product is assembled/ finished

- bolting table legs to frame
- Adding end caps
- Applying a finish
- Product is checked
- If there are any faults it is changed
- All the parts are fixed together
- placing filling in to pastry case
- Moistening edge and applying pastry lid 2 x 1 **[2]**

(iii) NOT packaged or dispatched

- Products sent to shops
- Putting product and instruction booklet into carton
- Strapping shut
- Attaching destination bar-coded labels to pallets
- A database is kept showing who the product is sent to and how many
- Using fork lift to load pallets onto delivery vehicle 3x1 **[3]**

Total [12]

2 (a) (i) 1 mark for a suitable product, typically produced in large quantities
For example motor vehicle **[1]**

(ii) Description (need not relate to a(i)):
- to spot weld body panels consistently **[2]**

(iii) One for each benefit
- consistency of product
- Can operate in hazardous environments
- Continuous production
- Reliable
- faster
- Accuracy
- Flexibility (can be reprogrammed) 3 x 1 **[3]**

(iv) One for each disadvantage
- initial cost
- creates unemployment
- Expertise needed to program
- Set-up time
- Space needed 2 x 1 **[2]**

(b) (i) Typically a production line product that may be monitored by computer:
- Frozen pizzas **[1]**

(ii) Named part of production process - must relate to (b) (i)
- automatic checking of product temperature **[1]**

(iii) Does NOT have to relate to above
- as they move through the freezing tunnel:
- Temperature checked
- Checking production rate
- Sensors under the pizzas monitored to ensure cooling effectively
- (or belt speed changed to keep right temperature etc.) **[2]**

Total [12]

3 Description - should relate to designing and the application
Advantages – time alone unacceptable: needs clarification as do saving money and speed

Two marks for each complete section e.g.

Database of components:

Stores information about components and their properties/costs/which can be retrieved by searching field (2).	Can compare suitability of materials on screen (2) etc
Designer can find components by typing in key words or code numbers	No need to type in the full component name (2)
	Designer can have access to information required online (2)

[4]

Internet:

Research alone – 1 mark, what for second	No time zone problems
Research from many component and material suppliers publish information on www.	Allows you to do a lot of research without leaving the office
Can develop designs with others miles away	Email allows rapid transfer of information including digital documents/drawings (2)
Can carry out market research online	Wider or global view
Can send designs for feedback from clients within a day	Speed of turnaround of information

[4]

CAD software:

Allows designer to produce designs on computer in 2D and view as 3D image	Ease of modifying designs on screen
One mark for CAD will do it automatically (1)	
Develop design and see results of changes immediately on screen	Saves having to re-draw
Files can be sent electronically for approval or directly to manufacture in CIM systems	Do not need to make hard copies

[4]
Total [12]

4 **(a)** No marks for the 4 sectors
One mark for each appropriate product example 4 x 1 **[4]**
Two marks for the modern technology and improvement in each case
Or for describing improvement
NOT for technology used in product since its introduction 4 x 2 **[8]**

(b) No marks for the product
One mark for each sector in which the stated product could be placed
(accept engine with 2 examples of sectors where used) 2 x 1
[2]
Total [14]

5 Candidate's choice of product
The response should reflect the unit specification content.

Guidance for marking
Technology used (nb not copied from hairdyer):
Clear indication of what is utilised (1 each) and how incorporated (1 each) into the product to 4 marks **[4]**

Materials and components/ingredients used (nb not copied from hairdyer
- One mark for each specific material identified (NOT polypropylene)
- One for component (NOT switch)
- One for details;
- One for clear explanation of how used in product – to maximum of 6 (see 8.2.4). **[6]**

Structure and Form (nb not copied from hairdyer
1 mark for clear sketch/drawing of product. Two marks for explaining how a specific feature (structure or form) of the product meets its purpose/reflects technology used, e.g. mobile phone **size, rounded corners** and **shell** structure reflect need to **keep in pocket** and **protect** delicate electronic components **[4]**

For example, in the hairdryer example given on the paper:
(NB items copied from this are NOT acceptable)

Drawing (S)
Heating element (M) coiled high resistance nickel chrome alloy wire(T)
Inner sleeve (M) to protect casing from heat (M)
Heat resistant grille (T): stops fingers from touching heating element(T)
Hanging clip/cable protector (M) : injection moulded polypropylene (M)
Polypropylene (M) switch (M): can be flicked with finger, allowing one-hand operation (S)
Moulded air inlet: holes in decorative pattern (S): won't be blocked by hand in use or when placed on a surface (S).
Casing (M): injection moulded (T) polypropylene (M): self-coloured (M), parts snap together (S).
Logo (M): sprayed directly onto body (T)

Total [14]

6 **(a)** Check response as a whole: Should relate to a **control system** eg description of control of CNC lathe, maintaining temperature in freezing tunnel, or on a production line.
(Note: Input, process, output are on the paper to help candidates structure their response. Candidates may put more detail in one stage, or may give a full correct answer with detail in inappropriate sections)

For example (6 marks)
Input:
Weight of each chocolate bar as it passes over a load cell
Process:
Weight of each bar is compared with acceptable range
Output:
Signal sent to line diverter to send rejects for reprocessing
Within tolerance continue along line

Allow up to 3 marks for generic description, eg
Input: from sensor/parameters
Process: comparison
Output: adjust equipment if needed

[6]

(b) Two for each way described:

- Example: Microchips pre-programmed to replace part of PCB in TV set
- Or give flexibility through different programmes as in washing machine

or providing different product features as in camera models 2 x 2 **[4]**

(c) Description of one example:

- E.g. PLCs programmed to control pallets of bricks as they pass through the kiln
- Reduce reject rate by ensuring correct temperature/time
- Decrease energy consumption/waste (1)
- Through automated control (1) **[2]**

Total [12]

7 In each case for 2 marks a description including the technology and effect.
Examples

(a) (i) eg Toasters
- With controls to avoid overheating
- Or using new materials for 'cool walls' **[2]**

(b)
- Systems to monitor dust particles in workshops
- Controlling ventilation to improve working environment
- Robotic systems used in hazardous environments
- Reduces risk to workforce
- Less arduous tasks through automation/mechanisation
- General reduction in working week over time
- Less manual labour when conveyors are used to shift products 3 x 2 **[6]**

(c)
- Mass production economies of scale passed on
- Greater range of products available
- Control of emissions/air quality

- electrically assisted gear change for trucks makes it easier to change gear
- typing something on the computer, if you make a spelling mistake it will tell you
- if you use a machine it is not so physical now because all you have to do is put in the size and press 'on' 2 x 2 **[4]**

Total [12]

8 (a) and (b)

Extended answers should conform to the 'Discuss' definition given on the paper.

- State 3 relevant points (3)
- Explain why they are relevant (2)
- Give an example or evidence to support answer (1)

(a) For example: (NB Candidates may state different relevant points and make different conclusions)

To make product sustainable it should:

- be made from and with materials from replenishable sources;
- be energy efficient in manufacture and use;
- be recyclable at the end of its life.

Designers need to ensure that they specify appropriate materials and consider the manufacturing process when designing.

- Using different materials and changes to production equipment will increase costs.
- This is likely to make the product more expensive for the consumer.
- Consumers may be willing to pay more for a sustainable product.
- Production should only start if market research shows there are enough to justify the changes.

(b) Modern technologies can open up new markets for products by:

- reducing manufacturing costs through automated production;
- making more targeted products e.g. by changing the program in an embedded computer;
- using smart materials for innovative products;
- reducing costs making a product affordable to a new set of buyers;
- there are still risks in introducing a new or modified product.
- Manufacturers need to carry out market research before going into production.

[6]

Total [12]

Report on the Units
June 2005

CHIEF EXAMINER'S REPORT

June 2005 GCSE Engineering and Manufacturing (1492 and 1496)

This was the third examination session for these qualifications and it was clear that many Centres had built on their previous experiences to ensure candidates had appropriate practical exposure and were able to develop their knowledge and understanding of the subjects effectively.

Evidence of good practice was shown by:

- working in partnership with local companies, giving the course a direct vocational context;
- candidates' work experience in related areas;
- visits to companies, or using video and other resources;
- practical tasks designed to extend knowledge and understanding;
- matching of assignments to individual capability;
- constructive feedback; and
- well planned portfolio work using the assessment grids as a working document.

This is a GCSE Double Award qualification, and as such candidates are expected to show a greater breadth of knowledge and understanding and to devote approximately twice the time to that expected of a single award candidate (for example in GCSE Design and Technology). In particular, they should have specific knowledge of the vocational area. The best candidates were able to relate their work to a range of examples from real industrial practice that they had studied or, in many cases, seen for themselves.

In some Centres, candidates had followed a traditional Design and Technology course, which limited their opportunities to meet the assessment criteria of Units 1 and 2 and to answer written questions in the examination of Unit 3. In these cases, candidates' performance did not reflect their ability.

Principal Examiner's Report
4868/4880

General Comments

This written examination is designed to cover the content of Unit 3, which is common to GCSE Engineering and GCSE Manufacturing. Questions are constructed to allow candidates to demonstrate their knowledge and understanding at each GCSE level from A* to G, anticipating that candidates will represent the full range of abilities. At the higher grade levels it is expected that candidates will be able to make connections between all parts of the specification, for example to apply their knowledge of technology to their knowledge of production.

It was pleasing to see a distinct improvement in performance over the two previous sessions. Many Centres had prepared their candidates well for the examination and this was thought to be due in part to centre attendance at INSET events over the last year, where Unit 3 had been specifically targeted. It was clear from these candidates' responses that they had practised similar questions from the two previous papers in this unit or from the revision guide used at INSET events.

However, there is still a marked variation in the level of preparation for this paper from centre to centre. Far too many candidates relied on general knowledge and generalisation, giving answers that did not reflect the technical nature of the unit. The unit should be taught through the delivery of Units 1 and 2 and candidates should be exposed to and be used to using a technical vocabulary, particularly when naming specific materials and processing equipment. It was disturbing that some struggled with terms such as 'Embedded Systems', 'PLCs' and 'sustainability', despite these being clearly within the Specification.

Engineering and Manufacturing are broad subjects and Examiners credited responses from a wide range of material areas. Most candidates attempted all of the questions, and were able to gain some of the allotted marks.

Comments on individual questions

Q1(a) A good introductory question, on which most candidates scored full marks, carelessness being the main reason for not doing so.

Q1(b) Some candidates confused the various stages and gave answers that were not relevant to the particular sub-section i.e. giving examples relevant to Packaging under Design. Many answers simply repeated the words 'assembly', 'finished' etc.

Q2(a) The responses to this question owed much to television advertisements, with the chosen product being either car or a mobile 'phone in the majority of scripts. At this level, the responses were acceptable.

Q2(b) There was a noticeable drop in correct responses to this part; the role of computers in monitoring was not generally understood. However, some good answers were noticed, obviously prompted by profitable works visits.

Q3 The fact that the question was about the designing stage was either not noticed or forgotten when most candidates gave their answers. Consequently,

most of the database applications, for instance, referred to stocking and re-ordering of parts for production.

Q4(a) The sector based question is now well established and candidates from many centres were obviously well prepared. There was still the recourse to 'lighter', 'stronger', 'cheaper' by the weaker candidates.

Q4(b) Generally well answered.

Q5 Again, this question should be well established in centres' minds. Candidates need to beware of using the same statements as used in the example and need to be directed towards a suitable product in order to be able to use a wide range of statements. When naming materials, candidates should be well aware by now that generic names (wood, metal, plastic etc) are not acceptable. Products chosen for this question varied considerably, from a Teflon coated frying pan to a jet fighter, with the mobile 'phone remaining the favourite. (Centres should be aware that the mobile 'phone could be the given example on one of the future papers.) One pleasing example was used by candidates from a centre that had clearly addressed the preparation for this question by using a Fireman's jacket, which gained them good marks.

Q6 It was very clear that candidates had not been taught this section of the Specification; perhaps centres assumed that as Embedded Systems appeared in a question in the January 2005 paper, the same topic would not appear again in June. The topics of Control Systems, Embedded Systems and PLCs need targeting by centres, particularly for their more able candidates.

Q7(a) Most answers were related to safety in production and not to the product .

Q7(b) Again, candidates failed to read the wording of the question carefully and ended up quoting benefits to the employer.

Q7(c) Another failure to note the wording, which was: 'to the consumer'.

Q8 This question was intended to challenge more able candidates although by following the 'discuss' instructions printed in the rubric lower ability candidates should have been able to pick up marks. In (a) very few understood the use of the word 'sustainability', confusing it with product durability. Part (b) saw some better attempts but few focussed on 'markets'.

GCSE Engineering (Double Award) 1492

Principal Moderator's Report

General

Both the number of candidates entering for the qualification and the number of Centres that entered candidates increased significantly over the June 2004 Series. About half the Centres entering candidates did so for the first time.

Unfortunately there is still confusion about the dates for submitting MS1 forms and CSFs to the moderators. The date for the **receipt** of these forms by the Centre's moderator is **10th January** (for January entries) and **15th May** (for June entries) in any year. If these forms are not received by the moderator by these dates, the moderation process will be affected and the publication of results to the Centre in August could be delayed. Several centres did not send their MS1 forms and CSFs to their moderator until June. This is unacceptable.

Centres should be aware that if any adjustments recommended by the moderator will result in a change to the Centre's rank order of candidates, the sample will be returned to the Centre to be re-marked. This obviously puts further pressure on the already tight timescales for moderation. This year, work was returned to about fifteen Centres for this reason.

Many portfolios had to be re-assessed by moderators rather than moderated because there was insufficient centre information about how the marks had been awarded against each strand in the assessment grid. The expectation is that the evidence will be tracked into the portfolio using page references and that there will also be assessor annotation or other information that indicates how and why marks were awarded. Without this, the moderator has no option other than to re-assess the work. Over three-quarters of the portfolios had to be re-assessed in this series.

Overall the profile of the candidates entered for the qualification was similar to that in June 2004, with a significant skew towards lower attaining candidates.

It was disappointing that few centres had responded to the guidance that had been given in the regional training events run in autumn 2004 and spring 2005 or to the assessment guidance document that was sent into all centres. The same basic misinterpretations of the specifications for both units that were seen in June 2004 were repeated in this series. There were still instances where the work for Units 1 and 2 was presented as a single portfolio, despite the strong recommendation that the units should be separated, both physically and in terms of the product used for each.

For a detailed explanation of the requirements of the specification for each strand in the assessment grids, centres are referred to the assessment guidance document which is available on the OCR website or from the Subject Officer at the OCR Birmingham Office. However, the main issues in each unit are detailed below.

Unit 4866

The basic requirement of this unit is that **the candidate will act as a design engineer in responding to a design brief provided by a client**. By carrying out research, the candidate will draw up a design specification, which will be presented to the client. The candidate will use client feedback to refine the specification and develop two or three design ideas. These initial ideas will be presented to the client and, on the basis of the feedback from this second consultation, the candidates will refine one of their design ideas into a final design solution. This will then be presented to the client and subsequently, using feedback from this presentation if appropriate, the design solution finalised and a plan for making the product will be developed to include quality control and tolerances.

- **strand a** – if no client is identified and there is no indication that client feedback has been given and used the best mark will be 3 or 4.

- **strand b** – to access b2 there must be a final accurate **engineering drawing** with dimensions and tolerances indicated.

- **strand c** – if there is no quality control identified the default is c1 and, because this is a non-linear strand, there must be Health and Safety information **related to** the design solution (not just general H&S issues).

- **strand d** – if the final design solution is not presented to the client or if the evidence for that presentation is not specific it is difficult to award anything against this strand.

- **strand e** – to access e2, there must be clear evidence that the candidate understands how quality control issues will affect the making of their design. Without this the best fit is e1.

Unit 4867

The basic requirement of this unit is that **the candidate will act as a production engineer in responding to a given specification and associated drawings**. It should be noted that there is no design element to this unit and any **design work** presented by the candidate **will not be credited**.

This unit requires the candidate to make a **single** product, the making of which covers the processes of material removal, jointing and assembly, treatment processes and surface finishing. It is expected that the making of the product will involve the use of ICT in some form (CAM, CNC) and the better candidate will justify such use. A production plan with a realistic schedule for making the product must be included and the candidate must understand quality assurance, quality control, TQM and critical control as applied to making **their** product (not to the manufacture of products in general terms).

- **strand a** – the production plan must indicate quality control and critical control points. It must be clear from the plan that critical control points involve go/no go decisions and that the outcomes of each of these is clearly indicated. Without these the best mark will be 3.

- **strand b** – there must be a realistic schedule identified against the processes in the production plan. The timescale could be hours, weeks or even lessons but

there must be a timescale, not just a Gantt chart with numbers. Without a schedule the default is b1 and, as this is another non-linear strand, the requirements in b1 must be covered.

- **strand c** – there must be clearly defined critical control points to access even c1. To access c2, these control points must be referenced to appropriate safety systems. To access c3, the implications of the go/no go decisions made at each critical control point must be identified and the impact on the production plan and scheduling clearly explained.

- **strand d** – to access the higher marks for this strand, candidates must explain (d2) and justify (d3) their use of ICT in the **making** of their product. (The use of ICT must be related to making the product not to designing it or to the production of the portfolio.) It is acceptable that candidates describe or explain why they did not use ICT (if its use was not appropriate) but to access d3 they must evaluate the use of ICT when producing their product in volume in an industrial situation.

- **strand e** – e2 requires an explanation of why the tools and equipment used to make the product were appropriate and not just a description, which would only access e1. In addition, any changes to the production plan must be identified and if there have been no changes then the reasons for this must be clearly explained. To award e3 there must be clear evidence that the candidate understands and evaluates how their product would be produced in an industrial context. A list of new technologies will not suffice unless it is related to the product that has been made.

These issues were identified in the June 2004 Principal Moderator's Report and expanded and exemplified in the March 2005 assessment guidance document. If this advice had been acted on by centres, the majority of the adjustments that had to be made in this series would have been avoided.

Centres are reminded that there will be a series of regional training events during the Autumn Term 2005. These are advertised on the OCR website and details can be obtained from OCR Training.

Advice to Centres

- Ensure that **all** MS1 forms and CSFs are received by the moderator allocated to the centre by the due date of either 10th January or 15th May;
- In Unit 4866, ensure that the feedback loop from designer to client in developing the final design solution is clearly evidenced;
- In Unit 4867, ensure that candidates clearly understand the impact on the making of their product of quality assurance, quality control and critical control points;
- Ensure that notice is taken of how the assessment criteria are expected to be evidenced, details of which are given in the assessment guidance document.
- Ensure that there are accurate page references to the location of the evidence against each strand in the assessment grid and that there is sufficient information to show how the marks have been allocated against the strand.
- Ensure that the two units are presented for moderation as two distinct and separate portfolios.

GCSE Manufacturing (Double Award) 1496

Principal Moderator's Report

General Comments

It was pleasing to see an improvement in the quality and presentation of work this year from a significant number of centres. This could have happened as centres now become more familiar with the requirements, standards and expectations of the assessment regime. Centres that have attended training sessions or that have received feedback from OCR, through coursework consultancy or Moderators reports and published support material, are now considering and applying the advice given. These centres tended to be the ones who had least difficulty in carrying out their marking, as they appear to have become more accustomed to using the assessment mark grid, and therefore moderation procedures were fairly straightforward. Where the assessment grids had been applied fully by the centres and the location of evidence had been identified there was little problem in confirming marks allocated by the centre. Unfortunately there were many centres where the work presented for moderation did not meet OCR standards and this was mainly because the assessment grids had not been adhered to and statements had only been given a cursory glance.

When using the assessment grids to assess candidates' work it is important that work is given the credit it deserves for the particular statement in the grid. However, centres must take care that they do not award duplicate marks from another statement for the same piece of work. Separate evidence must be seen in each candidate's portfolio for every statement in the assessment grids. Good practice saw candidates clearly dividing up their work into five clearly marked sections.

Unfortunately there is still confusion about the dates for submitting MS1 forms and CSFs to the moderators. The date for the **receipt** of these forms by the Centre's moderator is **10th January** (for January entries) and **15th May** (for June entries) in any year. If these forms are not received by the moderator by these dates, the moderation process will be affected and the publication of results to the Centre in August could be delayed. Several centres did not send their MS1 forms and CSFs to their moderator until June. This is unacceptable.

Centres should be aware that if any adjustments recommended by the moderator will result in a change to the Centre's rank order of candidates, the sample will be returned to the Centre to be re-marked. This obviously puts further pressure on the already tight timescales for moderation.

The moderation process benefited from those centres that identified, through annotation, the location of evidence. Good practice saw this being logged on the Unit Recording Sheet provided by OCR. Difficulties arose when centres only forwarded to the Moderator a breakdown of marks using OCR CSFs. Without suitable identification of the evidence there was a problem, in some instances, for the Moderator in identifying where a candidate had been given marks by the teacher. This year problems also arose when centres failed to send CSFs and Centre Authentication Sheets to the Moderator. As the CSF indicates how the candidate's work has been marked in each section it is a key document for Moderators and time was wasted chasing CSFs from Centres. Delays also arose in the moderation process when additional requests had to be made for Centre

Authentication Sheets to be forwarded; these documents are a QCA and OCR requirement and candidate processing was delayed until they arrived.

Examples of good practice showed candidates presenting their work in A3 document folders with pages numbered so that reference to the teacher mark allocation could be made. Unfortunately, some centres did not secure or bind work before sending it for moderation. Some centres even forwarded their work in loose leaf format without a binder or wallet and in one extreme case without even a treasury tag to hold the work together.

The use of writing frames, and other sheets prepared by the school, should be made with caution as they may prevent more able candidates accessing marks in the higher bands of the assessment grid.

In Unit 1 good practice showed that candidates had used a client/customer to gain feedback to research work in Strand a and by using the client again in Strand d to present information/ideas. In Unit 2 the candidate must work as a member of a team that collectively produces a batch of identical products. On occasion it had not been made clear in the portfolios how tasks had been allocated to team members and what contribution each member made to the manufacture of the product. In both units problems occurred where candidates had looked at some issues (health and safety, quality control and real world manufacturing) in general terms rather that relating them to the product being designed/manufactured.

Unit 1: Designing Products for Manufacture.

Strand a
Good practice in this area identified a customer/client who set a design brief for candidates to investigate. A specification was produced from the brief but this was developed further, later in the strand after appropriate research work had been carried out and the findings reported back to the client. Candidates should note that in this unit they are acting as a designer and their customer/client is the person who is employing them to carry out the work. The customer in this case is not usually the end user.

Evidence is needed in this strand of the design portfolio to show:

- a design specification developed from the given CUSTOMER design brief;
- RELEVANT research material, based on the brief, that can used to develop solutions in strand b; and
- the use of customer feedback to DEVELOP and JUSTIFY a final detailed specification.

Strand b
Candidates had a good understanding of the requirements of this strand and a range of ideas was presented. However, it is important that such ideas do relate to the specification and that those candidates to whom higher marks are allocated provide the expected explanation and justification when developing their ideas. Many candidates were allocated high marks in this section by centres even when they failed to provide the required explanation or justification leading to a final design solution. In far too many cases candidates were awarded marks for explaining ideas when, in reality, the written work was no more than a heading or title. It was also evident in this section that some centres had misinterpreted the assessment grids and allocated marks from b2 and d2 for the same piece of evidence, which is not allowed.

Evidence is needed in this strand of the design portfolio to show:

- a range of ideas that will answer the design specification;
- COMMENT on the ideas to highlight good and bad points, NOT just labels; and
- the selection and justification of a final idea, with carefully EXPLAINATION of how this decision was made.

Strand c

Health & Safety and Quality Control issues in this strand should relate to the candidates product and not be presented only as general descriptions. Quality control procedures should be highlighted and explained for each stage of manufacture. Evidence from better candidates did show that such work had been carried out; however to gain maximum marks in this strand it was important that these procedures are then fully evaluated and this information is presented in the portfolio.

Evidence is needed in this strand of the design portfolio to show:

- specific Health and Safety issues that arise in making the product identified in Strand b, NOT general issues; and
- the identification and EXPLANATION of quality control procedures that would be carried out at each stage of the manufacture of the final product. Once again these procedures should be RELEVANT to the final design in Strand b, NOT general QC checks.

Strand d

In this strand the final idea should be presented to the customer. The work presented here should be a development of that carried out in Strand b and should be separate from it. Some work failed to progress further than the rough sketches produced in Strand b. Other centres entered into the spirit of the strand and used a variety of methods to present and explain their product to the client. The methods used to present the idea did vary according to the materials used for the product but modelling, photographs of models, working drawings, mood boards, 3D rendered sketches and even prototypes were evident.

Good practice in this strand showed the candidate revisiting the customer/client to present the final idea and, in addition, recording the feedback from the session. Without the interaction with the customer/client it is very difficult to access high marks.

Evidence is needed in this strand of the design portfolio to show:

- ways of presenting the idea to the customer/client. These should be developed from Strand b and should be separate from Strand b;
- an EXPLANATION of the ideas (customer feedback may also be included); and
- the presentation of the work, following a variety of forms including mood boards, modelling, quality drawings, use of ICT and/or the use of a variety of drawing packages.

Strand e

In general the work in this strand is focussed on the stages associated with the manufacturing of the product as a single item and the quality assurances associated with that procedure. There was not a lot of evidence from candidates of considering how their product would be manufactured in real world situations in

quantity. Where real world manufacturing was considered it tended to be in general terms and not related to the product designed by the candidate.

Evidence is needed in this strand of the design portfolio to show:

- the manufacturing processes that would be used to produce the product in quantity;
- an explanation of what quality assurance processes would be carried out in the manufacture of the product; and
- how the product would be produced in quantity in an industrial context. This section should be relevant to the product presented in Strand d and NOT an explanation of general manufacturing processes.

Unit 2: Manufactured Products.

In this Unit, candidates are expected to work as a team and use a production plan in order to produce a batch of items. Several Centres appeared to have spent time designing the products to be manufactured. If this does happen, the work is not required for moderation purposes as there is no credit for such preparatory work.

Strand a
Very few candidates described a manufacturing process as required in a1; many used a production plan as the start to this unit. Evidence should be given to show how the plan has been developed to include manufacturing processes and quality control procedures. Many candidates failed to fully evaluate production plans therefore preventing access to marks available in the higher range of this strand.

Evidence is needed in this strand of the manufacturing portfolio to show:

- the description of a Manufacturing process;
- a production plan that identifies the stages manufacture of the selected product AND quality control checks that will be carried out at EACH stage; and
- an evaluation of the production plan.

Strand b
In this strand candidates are expected to describe the importance of using production plans; little evidence of this was seen from the majority of candidates entered. Team roles were allocated by candidates but once again little justification was evident in many folders as to why individuals had been given the task to be carried out.

Evidence is needed in this strand of the manufacturing portfolio to show:

- a statement that says why it is important to produce an accurate production plan AND why it is important to meet the product specification;
- a schedule of manufacture as part of the plan or as a separate item. Include time allocations for each stage;
- the identification of team members and the allocation of roles to them in the production plan, EXPLAINING why particular roles were allocated to individuals; and
- an evaluation of the production plan and a statement of how it could be improved in order for it to be more efficient.

Strand c

As in Unit 1, Health and Safety issues were identified but far too often it was only in general terms. Candidates gained higher marks by relating Health and Safety issues to their product and using them when carrying out the manufacturing schedule. Evidence for this was presented by the use of text and some centres also included photographic evidence. It was presumed that in the vast majority of cases quality control tests would have been used. However it is vital, in order to access the marks allocated, that evidence of these tests is recorded in the portfolio. To be awarded high marks in this strand candidates were expected to evaluate their planning and scheduling and justify how it could be improved to encompass total quality management and appropriate safety systems. Once again very few candidates did carry out such reflective work, and some centres did not take this into account when they allocated their marks for this strand.

Evidence is needed in this strand of the manufacturing portfolio to show:

- that Health and Safety issues relevant to the product have been considered, NOT just H&S in general terms;
- how quality control tests have been carried out (photographs may help);
- how work was carried out with due regard to H&S issues (photographs may help, NOT witness statements); and a justification of how production planning could be improved to allow TQM to take place.

Strand d

Evidence is required in this strand to show if teamwork has been effective. Candidates should reflect on good teamwork and how the structure of the team allowed manufacturing to take place. In order to gain high marks in this strand it is important for candidates to reflect on how the manufacturing team could be used in a more effective way to improve the production of their product. Candidates should detail what improvements could be made to the product as a result of buying in components or ingredients. In many cases this last aspect was not considered or there was little evidence in the portfolio to show that it had been carried out.

Evidence is needed in this strand of the manufacturing portfolio to:

- explain what is meant by the term good teamwork;
- identify effective teamwork during all production stages;
- explain how the team could be more effective when producing the batch of products; and
- explain how improvements could be made to the production of the product by buying in components or ingredients.

Strand e

The vast majority of candidates were able to identify tools and equipment that they had used in order to manufacture their product. However on many occasions the strand ended at this point as candidates failed to explain why such tools and equipment were appropriate for the task. Similar to the work carried out in Unit 1, many candidates failed to explain how tools, equipment and processes would be modified if their batch of products was to be produced in an industrial situation. Some centres had not taken into account the wording of e3 in the assessment grid and candidates had been allocated high marks without providing the appropriate evidence.

Evidence is needed in this strand of the manufacturing portfolio to show:

- a batch of products that has been produced by a team of students (photographs would be most helpful);
- descriptions of how the product was made, outlining tools and equipment used (photographs may once again be helpful);
- an explanation of why the tools and equipment were appropriate to the tasks, as well as highlighting what tools or equipment may have been more appropriate; and
- how the product would be manufactured in the real world in quantity. This section should be relevant to the product produced and NOT an explanation of general manufacturing processes.

General Certificate of Secondary Education Engineering (Double Award) 1492
June 2005 Assessment Session

Unit Threshold Marks

Unit		Maximum Mark	a*	a	b	c	d	e	f	g	u
4866	Raw	50	46	40	34	29	23	17	12	7	0
	UMS	100	90	80	70	60	50	40	30	20	0
4867	Raw	50	45	40	35	30	24	18	13	8	0
	UMS	100	90	80	70	60	50	40	30	20	0
4868	Raw	100	75	65	55	46	39	33	27	21	0
	UMS	100	90	80	70	60	50	40	30	20	0

Entry Information

Unit	Total Entry
4866	2863
4867	2866
4868	3035

Specification Aggregation Results

GRADE	A*A*	AA	BB	CC	DD	EE	FF	GG	UU
UMS	270	240	210	180	150	120	90	60	0
Cum %	0.2	1.3	7.2	20.2	39.8	60.1	78.7	92.6	100

2856 candidates aggregated this session

General Certificate of Secondary Education Manufacturing (Double Award) 1496
June 2005 Assessment Session

Unit Threshold Marks

Unit		Maximum Mark	a*	a	b	c	d	e	f	g	u
4878	Raw	50	45	40	35	30	24	18	13	8	0
	UMS	100	90	80	70	60	50	40	30	20	0
4879	Raw	50	45	40	35	30	24	19	14	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
4880	Raw	100	75	65	55	46	39	33	27	21	0
	UMS	100	90	80	70	60	50	40	30	20	0

Entry Information

Unit	Total Entry
4878	2489
4879	2239
4880	2359

Specification Aggregation Results

GRADE	A*A*	AA	BB	CC	DD	EE	FF	GG	UU
UMS	270	240	210	180	150	120	90	60	0
Cum %	0.2	2.0	9.1	28.2	51.4	70.1	83.5	93.6	100

2150 candidates aggregated this session

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