

Design & Technology

Advanced GCE **A2 H453**

Advanced Subsidiary GCE **AS H053**

Report on the Units

June 2010

HX53/R/10

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This report on the Examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the Examination.

OCR will not enter into any discussion or correspondence in connection with this report.

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Chief Examiner's Report to Centres

This was the first examination session of all units of the new specification. It is clear that the new units have been well delivered by Centres and that candidates have responded well. Examiners and moderators have seen some work of an outstanding quality, where candidates have demonstrated a wide range of skills and abilities representing the very best of GCE Product Design.

Although the four Units are distinct and different, they were designed to complement each other as supportive and preparatory elements in the development of the skills, knowledge and understanding required in Product Design. There is clear evidence that these skills and abilities have been transferred across the units. Work in units F522 Product Study, F523 Design, Make and Evaluate and F524/02 Product Design Component 2 show evidence of exciting and innovative exploration and modelling of ideas. There was also an intention with the new specification to reduce duplication in the units and allow Centres to focus on one or more specialist areas developing relevant and up to date Product Design.

The new specification has been broadened to allow access to candidates from eight focus areas.

The majority of candidates had a Resistant Materials focus with large numbers from Textiles and Graphics. There were an encouraging number of candidates entered for Built Environment and Construction, Engineering, Manufacturing, and Systems & Control. It was disappointing to see only a very low number from a Food focus.

There were some excellent examples of creative thinking in F521: The Advanced Innovation Challenge. This new and exciting assessment unit has had impact on the other units. Centres are more familiar with the examining routine and candidates are expanding their range of design thinking.

Centres are reminded to ensure that photographs show clearly the features and qualities of the design models.

Exceptional work was presented for assessment for the Product Study Unit F522 and the Design, Make and Evaluate Unit F523. It is encouraging that increasing numbers of candidates are submitting work as e-portfolios for these Units. Candidates have used digital technologies to record the development of work in 'real-time' and shown effective evidence of interactive dialogue.

Radical changes were made to the Design, Make and Evaluate F523 Unit. Centres are to be congratulated upon the way in which they embraced the new Unit and prepared their candidates. The changes were made to give more freedom to candidates to focus on the key elements when designing making and evaluating and to enable teachers to decide upon what level of intellectual demand and skill candidates had demonstrated when assessing their performance. The change in emphasis on assessment takes into account the differences of working in all of the material focus areas and will ensure a fair judgement.

The written papers F524 were also a radical change in format although the style and demand of questions were very similar to the previous specification.

The majority of responses to F524/01 and F524/02 were for Resistant Materials with large numbers attempted the Graphics, Textiles and Manufacturing questions.

There were significant numbers attempting Built Environment and Construction, Engineering and Systems and Control. Very few candidates attempted the Food question in F524/01 or F524/02.

Report on the Units taken in June 2010

Although the overall standard on both papers was good, some candidates attempted a question that they were obviously not prepared for. Some candidates attempted the Built Environment and Construction question in F524/01 or F524/02 with very little understanding of the specialist material and constructional detail required to achieve the full range of marks.

With the exception of Question 5 Manufacturing, part (e) (ii) of F524/01 included the instruction for candidates to 'Use a flowchart and/or annotated diagrams to support your answer'. A flowchart should include all details of the process concerned and show a clear sequence of operations with indications of quality control checks or other decision making where appropriate. In most cases candidates made the decision to use annotated diagrams to ensure that they include sufficient detail to access higher marks. Some candidates produced very detailed and full flowcharts to include the same level of technical detail. A significant number of candidates however produced a flowchart with very limited detail to describe the given process, and consequently did not achieve good marks.

Some (e) (ii) questions will be more suited to a flow chart response, others to the use of annotated diagrams. In many cases candidates produced a combination of both to present the fullest and most detailed answer.

Some candidates used additional supplementary sheets for F521, F524/01 and F524/02. In most cases candidates had not used the space available to answer and additional sheets were not really required. Centres are reminded that candidates should use the answer booklet only for F521: Advanced Innovation Challenge.

The following reports contain detailed breakdowns of general candidate performance of the June 2010 assessment session. They also include very valuable guidance on how to access the full range of marks available.

It is helpful if the reports are read in conjunction with the full specification and appropriate mark schemes.

F521 Advanced Innovation Challenge

General Comments

Administration

It is important that both examination papers are dispatched to the appointed examiner in one package as soon as the reflection paper has been completed on the date set by OCR. Candidates will have access to their challenge work booklets during session 2; however they are not to write in it.

Answers must be completed in the challenge booklet and realisation booklet, there is additional space in the booklet should candidates require it; however, the use of this space should be labelled carefully with the box number that the work relates to. Additional supplementary sheets should be avoided and additional paper of any kind should not be stuck into the booklet. There is also no need for candidates to stick models or samples of materials into the booklet, photographs, sketches and notes will be sufficient to communicate ideas to the examiner.

All materials relating to examinations sent from OCR to centres will be dispatched to the examinations officer. It is important that colleagues check with the examinations officer that they have received all relevant and most up to date information prior to starting the challenge activity. Examination notices must be displayed in the area where the examination is to take place and an invigilator should be present. The teacher is there to read the instructions.

Running the Challenge

Centres are reminded that the role of the teacher is that of a facilitator and not that of a normal classroom teacher. They are there to provide access to modelling materials, monitor health and safety issues and read the teacher script to candidates, elaborating and explaining where this is indicated. Teachers must not:

- give advice to students about the design or manufacture of their product;
- cut materials to the correct shape or dimension for students.

It must be made clear to all candidates that this is an examination to assess the individual student's designing and modelling capability.

A number of students have approached the challenge with pre-conceived ideas and have failed to respond creatively to the design challenges.

It is the centres responsibility to provide a suitable range of modelling materials for candidates. It is not advisable for candidates to bring their own materials for modelling as this will hamper design thinking. A 'job bag' should contain inspirational materials, images and information about materials, anthropometrics etc that could be useful when designing.

It is not advisable to second-guess questions as this can also hamper creativity. The way in which Centres use the pre-release theme can have a significant impact on the responses. A few candidates misinterpret challenges, either because they do not read them with sufficient care or because they choose to base their work on practiced work to a design challenge. The themes for the examination deliberately give little opportunity to prepare specification points or ideas in advance of the examination to prevent over-preparation of candidates.

Report on the Units taken in June 2010

Centres are reminded of the specification content:

“A theme is released in the September prior to the examination. Each theme runs for a year, enabling candidates to research and gather resources to form a personal handling collection/inspiration box/mood board, etc. Candidates should identify and collect these resources individually, into a collection called a ‘job bag’, which is then taken into sessions 1 and 2. A challenge sheet based on the theme will be included with the workbook and will first be seen in session 1.”

Candidates must not share resources or job bags during this examination.

Photographs

The quality of photographs is generally good but examiners have reported some problems with the photographs presented for assessment. These problems include; failing to focus on the object, photographs being printed at a size too large for the allocated positions within the workbook. Photographs must be stuck into the correct boxes in the booklet.

It is important that the centre provides colour images of a good quality. The addition of a card with the candidate’s name within the photograph can be used to aid the return of photos to students but the photograph should focus on the work. Centres are reminded that three “teacher” photographs is the minimum required. Additional photos can be added to the workbook. This is particularly important if it is necessary to show other parts or views of an artefact, mechanisms etc to fully illustrate the final outcome. A small number of candidates did not stick photographs in the correct place. Photograph 1 is of modelling progress after first session, Photo 2 progress after the second session and Photo 3 the final model. Space in this area allows for an extra photograph of the final model if necessary to show detail or workings. More photographs can be included in the evaluation or progress report boxes.

It is recommended that if candidates wish to annotate photographs, that a second print is produced and stuck into either the appropriate section of the workbook or into the ‘additional space’ and clearly labelled and then annotated. Candidates should be encouraged to stick photographs into the workbook as they are printed.

Security of Workbooks

Centres are reminded of the importance of appropriate security of all workbooks between the three sessions of the Innovation Challenge.

Work of Candidates

Some highly creative work has been seen this session from candidates who have shown both design flair and sound technical knowledge.

It is recommended that a significant part of the preparation for the exam should include techniques to allow the candidates to present ideas quickly and practice of workbook completion under timed conditions. Examiners are aware of the pressure on candidates in this examination and marks are awarded with this in mind.

It is also worth noting that “skills involving analysis, evaluation and synthesis (creation of new knowledge) are considered of a higher order, requiring different learning and teaching methods, than the learning of facts and concepts”. Centres should teach evaluation and analysis throughout the ‘AS’ year in order for candidates to achieve greater success in these areas. It is notable that areas such as specification, evaluation of ideas and final products and the realisation test specifically test these skills and are areas that continue to discriminate well between candidates. In some centres, candidates responded to F521/01 in a formulaic way –

students seemed to have been taught what to write/do in each box but unfortunately are not independent enough to respond in a more creative way.

The Challenge Assignment

Initial Thoughts

Candidates used a combination of text and drawings to explore the challenges within the theme of 'travel and commuting' and identified possible design areas/problems. Some candidates failed to think creatively about the challenge or context and suggested only very predictable responses. Candidates need to be encouraged to explore the chosen challenge widely, take risks and think creatively. Many candidates explored ideas in depth thinking creatively, whilst considering the transport and commuting environment and market they were designing for. Better candidates show greater creative thought as well as consideration of how /when/where and who the product may be used.

Design Brief

Many candidates restated the challenge 'word for word' in this section. Candidates should be encouraged to write clear and precise design briefs that develop the design challenge further and offer scope for creativity. The majority of candidates identified the appropriate user groups for their products.

Specification

This section continues to discriminate well between candidates. The more successful responses are where candidates concentrate their thinking on the functional and user needs of the product in the design situation and ensure that the relevance of all points are explained. Generic specification points cannot be awarded marks, unless made relevant to the question and answered through specific references to the situation and theme. Careful justification of points is needed. It is disappointing that a significant number of candidates continue to produce specification points that lack justification. Specific detail is required for high marks in this section, eg weight, size, material properties etc. There is often evidence of mnemonics, as an aid to memory, used to prompt candidates to cover a broad range of specification points. Unfortunately, this often leads to a list of generic points.

Ideas

Higher performing candidates produced a range of functionally different creative ideas that clearly related to their specification, situation and the potential users. Most candidates produced a suitable range of creative ideas, although for some it seemed difficult to move away from one basic concept, meaning that all ideas were essentially the same, with relatively superficial changes in shape or configuration. Candidates should be discouraged from presenting existing products as their own ideas, or reproducing the initial thoughts from section one of the challenge activity, disregarding both the design brief and specification; originality and creativity are key aspects of this criteria.

The standard of design communication was generally very good. Candidates used a combination of drawings, text, annotation and occasionally modelling/photographs to show their ideas. Higher performing candidates gave different views of objects or parts of objects and clearly communicated their creative design thinking, along with annotation relating to specific materials and construction methods. Reference to the specification was generally good. Annotation in some cases lacks sufficient evaluative comments and specific material and manufacturing techniques; in many cases annotation for this section was purely descriptive and showed no real evaluation at all. Some candidates only focussed on the positive aspects of their ideas. More able candidates were able to offer objective evaluation against their specification

points. Reference to source of inspiration/job bag was usually given although not always with pictures. The better examples of evidence from job bags were where candidates had collected a very broad range of items and took their inspiration from unrelated inspirational objects.

Group Feedback

The majority of candidates planned for the presentation and recorded the outcome. Where candidates scored highly they had taken the feedback and responded giving suggested improvements with the use of sketches to illustrate. Some candidates benefitted greatly from the feedback from other students showing a receptive approach to ideas. This is a skill that can be practiced through coursework, design activities and practice challenges.

Development of Ideas

There has been some improvement in this section, most candidates use notes or annotations to show how they are developing and improving their design towards an optimum solution that satisfies the design brief, specification and needs of the user. Candidates are also expected to show consideration of materials, components and to consider methods of manufacture for their product. In some cases there was little or no evidence that candidates have any understanding of how their designs could be manufactured commercially using volume or batch production. Most candidates are able to suggest materials for construction, however generic terms such as 'wood', 'plastic' or 'card' should be avoided, candidates will have information in their job bags about suitable materials and specific names and details are expected. Unfortunately, in some cases the materials are unsuitable for the product and its application, candidates should be encouraged to consider and explain their choice of materials. It should be remembered that in this section the materials and construction are those that would be used for the product should it be manufactured commercially and not those that would be used in the workshop or for the model making.

It is expected in this section that the size of the product is considered, dimensions of individual features, components and/or thicknesses of materials are considered by the more able candidates.

Plan for Modelling

Action plans were good with lists of materials and action plans ranging from basic statements to ones which included time schedules/flow charts and annotated sketches of how model would be constructed etc

Recording Progress and Modelling

Reflection, this section has improved but many candidates are still focussing on the problems they had encountered rather than details on all the possible solutions.

There were some excellent examples of models – the main point here is for candidates to use appropriate modelling materials to enable them to fully reflect their design – where candidates lost marks was where they failed to show all parts of their product through the model, eg if it has moving parts these were not modelled.

In a few cases candidates used inappropriate materials for their model making. In some cases candidates attempting to model in resistant materials were unable to show all aspects of a model due to time limitations. Good preparation for the examination, by the centre, in terms of providing a suitable range of modelling materials is really important. Most centres seemed to provide appropriate modelling materials, where a wide range of items was provided the candidates were unrestricted and able to reflect their design fully. Candidates need to be able to develop their quicker modelling skills using a variety of materials. Creative use of common inexpensive materials is probably the easiest way for candidates to score well in this section. Kits should be

avoided for final models as it restricts the candidate's ability to model their design accurately and skilfully; as does the use of existing products to form part of, or most of their model

In a few cases the quality and number of photographs made it difficult to judge the real quality of the models made. It must be remembered that three teacher photographs are required to show the stages of modelling. It can also be helpful to the examiner where candidates have used photographs through the 'reflect and record' section and in the evaluation, as it is easier to see the skills they have used. Some centres need to think more about how best to photograph models to show full details, and any mechanisms etc. The use of duplicate photographs within the evaluation can also assist communication.

Evaluation

Many candidates fail to record any further modifications in detail and some don't indicate any possible weaknesses of their product. Some candidates just talked about their model and not the product so failed to score any marks. Evaluations should link to the specification and identify weaknesses or points that can be improved upon. This is an example of higher order thinking skills mentioned at the start of the report.

Comments on Individual Challenges

Generally the most popular questions were the security of personal items, the shelter, the transport device and litter questions.

Responses to most questions were similar in quality, with all questions allowing scope for creativity.

Challenge One – security of personal items: candidates concentrated either on storage facilities provided on the transport or products (cases etc) which were owned and carried by the user – rarely did a candidate begin by considering all options. Many produced very predictable solutions, however there were some creative responses and a varied response with material choice, with a significant number of textile based outcomes.

Challenge Two – transport: this was probably the challenge that produced the most creative work –. Some ambitious designs were proposed but rarely did they consider the basic practical requirements, such as safety etc.

Challenge Three – lunch pack: many responses interpreted this question as a 'sandwich box'. However some quite innovative, practical solutions were proposed; and this interpretation of the challenge did lend itself to the modelling stage of the paper. A full response required nutritional information to support the choice of food in the pack fully.

Challenge Four – litter: There were a wide range of responses to this question from bins or litter pickers for public transport to personal litter collection devices to be carried by an individual or used within a car. Some candidates ignored the fundamental reference to transport and simply designed litter bins with little or no explanation of how or where they would be used. Most only considered the needs of the user who was disposing of litter, relatively rarely was the method of emptying the bin mentioned.

Challenge Five – shelter: In a similar way to challenge 1 each candidate tended to focus exclusively on either static shelters which (presumably) would be provided by local authorities/train operators etc as a public facility or umbrella like structures that would be purchased by the user. In a similar to challenge 4 many who were designing public shelters gave no indication of where the product would be located. Some candidates failed to respond to the bullet point stating the shelter was for a minimum of two people, or for use within the context of travel and commuting.

Challenge Six – entertaining children: there were some creative responses; that ranged from an electronic devices to multifunctional, portable devices - but all too often they had based their ideas on an existing child's toy rather than designing their own. Good consideration of the users' needs and safety were evident in most responses.

Reflection Paper

As in previous sessions a number of candidates just simply seemed to write down everything they had learned rather than giving a focussed response to the question. Candidates should be encouraged to read the question carefully and plan their answers ensuring all bullet points are addressed in relation to the topic of the question. They also need to support points with specific examples in reference to their product. See Examiners mark scheme.

It should be noted that it is stated in the specification; "candidates have the opportunity to reflect on the challenge by answering questions that require them to consider their product. These will be derived from a design, manufacturing or marketing perspective, including: sustainability and the environment; product life; social, moral and cultural issues; environmental issues; inclusive design; the human interface; aesthetics; scale of production; production technologies; fashion; marketing; commercial issues." These areas should be taught through the 'AS' course, and students should learn to apply knowledge to products when evaluating and analysing. Candidates should be familiar with technical terms related to these topics.

Question 1: A number of candidates failed to cover cultural issues at all in their response to this question, perhaps due a lack of understanding. When candidates made a point, it was rarely detailed with examples. Many candidates were able to refer to belief and culture, traditions, different cultures and language, avoiding offence, accurate translation when importing products; or recognised that England has a multicultural society and that there are also cultural differences between generations. Some referred to inclusive design/barrier free design, or products that are morally and ethically acceptable in one country not being unacceptable in another. Better candidates used examples or suggested research and related to their product to support their discussion; eg Islamic art not allowing the use images of people, leather or fur products causing offence, use of labour intensive 'sweat' shops, garments that are short or have short sleeves in some countries. It was also recognised by many that, socially, people may want environmentally friendly or fair-traded garments and products; however many talked about sustainability with no context of cultural issues. The product impact could be related to environmental impact but needed to relate to the candidates product and associated cultural design factors: (i) what happens when we design new products, (ii) what happens when we make new products, and (iii) what happens when we use new products. Some candidates could not make the connection between what cultural issues were and how they could affect material/ construction techniques and product impact.

Question 2: The second question was generally well answered. The 'unique selling points' of the product was easily answered by most candidates. The majority of candidates managed to give a suitable response for the modifications to make the product more economically viable – however, many just gave modifications to make a product more sustainable. The better candidates were able to relate their answers to the topic area of travel and commuting and gave good responses on specific marketing techniques, commercial viability and scale of production. A number of candidates were not specific enough about how they would engage their market in a travel or commuting context or were unable to discuss the commercial viability of their product; failing to address the overriding question that required a presentation to the transport company. Specific examples of how you would target and engage the market for the product within stations, in newspapers or magazines, with promotions, or rental and leasing opportunities etc was needed, many candidates did this well and suggested suitable methods of production depending on the size and scale of their product.

It should be noted that candidates need to read each bullet point carefully and address each to ensure access to the full range of marks.

F522 Product Study

General Comments

There is now an opportunity for candidates to enter E-Portfolios on an individual CD in the appropriate OCR standard format of Power Point. Although E-portfolios are not a mandatory requirement, OCR sees it as the preferred option and centres are encouraged to develop in this direction as soon as they feel comfortable with the change of approach. There is no pressure to do this immediately but centres are encouraged to explore this possibility. OCR are developing an INSET course for next Autumn session which will give delegates the opportunity to either engage in basic E-Portfolio techniques or undertake a more advanced session. This course will be offered by one of our senior moderators at their own centre where appropriate equipment and support will be available. Places will be limited and early booking is advisable.

This session only 60% of candidates entered their work as E-Portfolios. OCR appreciate that many centres have logistical problems with appropriate access to computers and scanners. The reason that OCR is encouraging the E-Portfolio has a clear rationale. The overall ethos of this new Product Study unit is that evidence is provided in real time, as it actually happens and that 'interactive dialogue' is used to present information, again in real time (Interactive dialogue means discuss issues in an interactive way – this should involve either asking questions and receiving answers or recording group discussions).

Candidates presenting CD's have the opportunity to include video clips and sound bites as part of a PP presentation, which show real time use of their selected product and development of ideas. This June there were some outstanding presentations from candidates who utilised this new approach but again it is interesting to note that not all who resubmitted a CD portfolio chose to do this. In this session over half of the CD's presented were PP presentations including scanned images and digital photographs without any video clips or dialogue. This reflects practice in previous sessions; candidates should be encouraged to develop this approach.

It is worth stressing again that whether centres choose to continue to enter paper portfolios or E-Portfolios it needs to be made categorically clear to candidates that the presentation of information in 'real time' is mandatory. They must show digital images of work undertaken as it is actually taking place. Candidates who failed to do this in some key sections would again have lost marks. 'Interactive dialogue' is also an important requirement. Candidates need to understand that this means an interaction between themselves and others to discuss issues, as they actually arise in real time. Videos and sound bites are a good way to achieve this; those working on paper still need to meet this requirement-the use of digital real time images is mandatory, dialogue can be added as written comment by others presented in their folder. Some candidates may be reluctant to allow others to write on their portfolio pages – the use of 'overlay pages' may be one way of overcoming this. Candidates must not be reticent about adding real time comments, it may be that comments from others are not well presented; they must however be there! This approach is successfully adopted in the Advanced Innovation Challenge and its use should be actively encouraged in this unit.

Many centres downloaded the new interactive CSF F522 mark sheet from the OCR website. This practice is to be encouraged as it dramatically reduced the number of addition and clerical errors. Centres are to be congratulated on the interpretation of the new sub-divided mark scheme in the 'development of improvement' section. This led to a more accurate application of marks against the assessment criteria.

Moderators report that the vast majority of folders/presentations were well organised and matched the layout of the mark scheme. All candidates should be encouraged to structure their work in this way.

Report on the Units taken in June 2010

Some centres are still using practice and techniques from the old legacy specification:

Details of the new specification are clearly labelled Design and Technology: Product Design Advanced Subsidiary GCE H053 Unit F522. For first award in Summer 2009.

To support Centres and individual candidates, guidance for the new Unit can be found in the recommended OCR text 'OCR DESIGN AND TECHNOLOGY FOR A LEVEL' available from Hodder Education ISBN 978-0-340-96634-1.

OCR also offers a comprehensive programme of training for Design and Technology – details can be found in 'Eventbooker' – www.ocr.org.uk/eventbooker. Including:

Basic and advanced E-Portfolio course offered by a senior examiner at his own centre.

Section by section guidance on Product Study requirements for Unit F522.

This product study should take candidates 30 hours to earn up to 120 marks.

(1 hours work is notionally 4 marks)

OCR recommended A3 /PP allocations are indicated for each section.

Product Focus and Analysis (8 marks 2 x A3/PP)

Moderators report that a wide range of interesting products were chosen this session:

Products can be selected from any of 8 different focus areas:

Built Environment and construction, Engineering, Food, Graphic Products, Manufacturing, Resistant Materials, Systems and Control, Textiles.

For marks in the top band all of the following should be addressed:

Detailed description of the intended purpose of one single selected named product (not a range), key criteria used in the design of the product, the needs of the manufacturer and the needs of the consumer.

Where all four of the above have not been covered the Centre should consider awarding marks in the lower bands. Moderators report that the needs of the manufacturer section are not covered to sufficient depth.

Some candidates and some whole Centre groups are still considering generic groups of products. The first page of the candidate product study should state quite clearly and categorically what specific, single named product has been selected for analysis.

- Better candidates awarded marks in the top band show a clear photograph or video clip of their single selected product being used. Many centres are encouraging this approach with their candidates to very good effect.
- For the new specification 'real time digital images' are required which show the single selected named product in use. Not all candidates do this and this continues to be a problem with some candidates submitting work as A3 portfolios.
- 'Interactive dialogue' should be used to identify product features- this means talk about the product with others and record observations in real time-as it actually happens. This was a major omission in the majority of candidates submitting work this June.
- Those submitting work on CD have the opportunity to discuss their product and present real time evidence as a video or sound bite.
- Asking the views of third parties and recording their responses was a feature of some excellent projects this session.

- It is absolutely essential that those candidates who enter their work as A3 portfolios engage in the same academic activity as those who submit E-Portfolios.
- Candidates who do not present real time evidence and interactive dialogue should not be marked in the top band.

Strengths and Weaknesses Comparison (12) (2x A3/PP)

Good candidates should be encouraged to analyse the strengths and weaknesses of a product in comparison with similar products. Good responses often include a conclusion or summary, which relates similar products back to the single selected named product. Poor responses often include charts and tables populated with Internet images with no identification of the strengths and weaknesses of the selected product. Candidates should be encouraged to show evidence of actually using a range of products, which are compared with the selected product.

For marks in the top band the following should be addressed: function, suitability of materials and manufacturing processes, ergonomics, aesthetics and cost.

- For the new specification 'real time digital images' should show the strengths and weaknesses of the single selected product and also comparative products. The actual selected product should be used and shown in use.
- Comparative products should be shown in use- in real time.
- This is a departure from previous practice and must be undertaken to meet the assessment criteria. Very few submissions this June showed a range of comparative products actually in use.
- Digital photographs or videos should be used.
- 'Interactive dialogue' should be used to discuss relative merits of products with others and recorded using video, sound bites, or written comment. Very few candidates provided this in this session on A3 portfolios.

Moral Implications (8) (1 x A3/PP)

This is about the Identification and analysis of the moral implications associated with environmental, social and economic issues in the design and use of the product.

Moral implications should be considered in relation to the design and use of the product chosen for study:

The requirements for this section in the new specification are generally unchanged. Centres should note that there is now a requirement to consider the moral implications associated with economic issues.

This section has a new direction and is being misinterpreted by many candidates. The clear emphasis is now on the moral implications associated with three specific issues. Centres need to prepare candidates for this by organising and structuring ethical debates about the environment, social cultures and economic issues. The term 'economical issues' should be avoided as it encourages a discussion of general cost issues, which is not what is intended. A far wider debate about the effects of the global economy and work force issues is required. This section is very poor in many cases and moderators are making large reductions. Marks in the top band are not awarded in many cases. For future candidates and any candidates re-submitting, an ethical debate about economic issues is essential. Clear advice and structured teaching is required. Advice may be sought from the Intermediate Technology Development Group now renamed Practical Action. Access to this is through their Sustainable Design Award Web site: (www.sda-uk.org). They are willing to help and have structured their advice to mirror our assessment criteria. A new DVD is now available 'Sustainability Matters in Design and Technology.' This is targeted at GCSE but has will provide a useful starting point for AS and A level candidates. Centres may wish to consider inviting staff from 'critical thinking' departments to facilitate discussions or inviting in visiting speakers.

Moderators report that many centres are not presenting a good response to this section and are content to award marks in the middle band for average responses. In some cases where top band marks are inappropriately awarded it can have the effect of moving the whole centre out of tolerance.

Brief and Specification for Improving the Product (8 1 x A3/PP)

The design brief presented should relate to improving the single selected chosen product in some way. Centres should award marks in the lower bands where an improvement is not identified, or where the proposal is to redesign a complete product. Moderators still report that many candidates are still trying to improve too many aspects of their selected product.

Specifications need to be detailed and justified, resulting from the objective analysis of the original product. Where there is little or no justification centres should award marks in the lower bands. It can help if the justification for each specification point is clearly identified by using a different font size, style or colour- better candidates often use this technique, and it would help candidates in the middle and lower bands.

- For the new specification these two sections are linked and assessed under one criterion for brief and specification.
- Centres should note that the brief should identify a clear improvement to one single selected product and the specification should be fully justified.
- Proposals to redesign a complete new product should always be marked in the lower band.

Development of Improvement (56 10 x A3/PP)

This new section, relies on the integration of three separate requirements for successful completion. There is a very large allocation of marks for this assessment criterion; this is deliberate as it was considered during development that this is where the majority of candidates would choose to spend their time and energies. As there will be many different approaches to this section appropriate to different focus areas, it might be helpful to consider that the expectation in relation the notional guideline of 4 marks per hour means that candidates should devote 14 hours to this section.

56 marks is a very large allocation to accurately apportion in three mark bands and many Centres found this difficult. For this session OCR produced a new CSF F522 form to make this task easier. The 56 marks have now been broken down into three sections as identified below. Additional advice is also given on the new CSF F522 form to award marks in different bands within each section. The new interactive mark sheet is available on the OCR web site. Please make sure this new form is used in the future as it enables marks to be appropriately awarded and cuts down clerical and addition errors. Please note that only the interactive form automatically adds up candidate marks.

The new sections:

- The generation of innovative/creative ideas (14)
- The making of appropriate prototype models (36)
- Detailed and objective evaluation of ideas against the specification. (6) (This is ongoing evaluation in this specification and should be carried out as ideas develop)

Present a wide range of innovative/creative initial ideas, which demonstrate a high level of development using high quality annotated sketching, real time digital images and interactive dialogue. (14 marks)

Report on the Units taken in June 2010

Integrate this with real time evidence of a wide range of appropriate prototype models.
(36 marks)

Evaluate ideas against the specification in real time and justify the choice of one idea worthy of being taken forward. (6 marks)

The expectation here, for marks in the top band, is that a wide range of innovative/creative initial ideas are presented which demonstrate a high level of development using high quality annotated sketching. Simplistic sketches with little or no annotation should be awarded marks in the lower band. The expectation is that a specific improvement is developed, a few candidates try to re-design a whole product, and this is not the intention of this section.

- For the new specification, for all focus areas there is a need for presenting innovative and creative ideas, which are annotated. This is required for an E-portfolio as well as A3 portfolios-many candidates submitting this June did not provide sufficient well-annotated design sheets.
- The main difference for this specification is that these ideas are not presented in a separate section but integrated with ongoing evaluation and the development of the improvement through appropriate prototype modelling.

It is important that Candidates evaluate their ideas against the specification and clearly justify decisions made. Where little reference is made to the specification, centres should award marks in the lower band. No marks at all should be awarded where there is no reference to the specification. Centres should note that it is impossible for candidates to access these marks if the original specification is missing. Zero for the specification automatically results in zero for the evaluation against it.

Where candidates choose to annotate their ideas sheets, they must make it clear which specification points are being cross-referenced. Colour highlighting can help in this respect. Better candidates clearly rationalise the choice of one idea to be further developed.

- For the new specification Centres should encourage the use of ongoing evaluation on the candidate ideas sheets.
- Previous practice of tabulating responses to this section could still be relevant to the justification of an idea to be taken forward but should not be encouraged as the main mechanism for ongoing evaluation which is best provided in real time as ideas develop.

Moderators reported some very high quality models were presented using a range of modelling materials. Many moderators however pointed out that some centres were concentrating on producing one high quality single prototype. This may produce a high quality outcome but will not access the full range of marks available for the development of a wide range of appropriate prototypes.

Testing of Final Developed Idea (12 marks 2 x A3/PP)

There is no requirement to make a test rig - candidates can if they want to, indeed many candidates still produced test rigs in this session) Any appropriate method or system to formally test and evaluate the final developed idea will meet this requirement. Appropriate testing might include using a product or getting others to use it, wearing it or getting others to wear it or eating it or getting others to eat it. A scientific or technical test could also be appropriate for some focus areas. Whichever method is thought by the candidate to be appropriate, there must be formally presented results. The results should be presented in real time, clearly and concisely. Many candidates are using customer surveys; some of these produce low level numerical data, which was of little value. Candidates should be encouraged to deepen the level of their analysis. It is worth emphasising again that real time evidence is required. Copying out neatly the responses of others is counter productive – it could actually result in reduced marks if there was no real evidence of real people being involved.

Moderators reported some excellent examples of testing by outside agencies related to the chosen product.

Producing a summary of the results of the product development with a detailed analysis of the prototypes and final tests contributed to establishing the validity of the chosen idea.

Present One Further Improvement in Detail (8 marks 2 x A3/PP)

In addition to the presentation of the final test results, candidates should summarise the results of their prototyping and suggest one further possible improvement to the product. There are three distinct sections to this assessment criterion. For marks in the top band, all three areas need to be considered. Better candidates show a clear annotated sketch of a further improvement. Analysis of results is also a more complex matter than simply stating results in a table.

Communication (8 marks)

Use a wide range of high quality text, graphical techniques, digital technology, and interactive dialogue as appropriate to present information. (8 marks All 20 A3 sheets)

The use of ICT must be included in the range of communication techniques used in the presentation of the folder; an over-dependence on the use of ICT/CAD should however be avoided. A combination of different approaches is to be encouraged. Candidates should be encouraged not to over-enhance the background of their ideas sheets if this impairs the clarity of presentation. Many moderators report that it is hard to read through some 'decorative backgrounds'. Some candidates spend a disproportionate amount of time in enhancing the appearance of their pages, often at the expense of clarity. Candidates presenting on CD still need to provide evidence of annotated sketching. This assessment requirement is not met by scanning in a few small images amongst other computer-generated design. Many candidates try to avoid this issue.

- For the new specification the use of 'real time digital images' is mandatory-they have to be used to record evidence of work as it actually happens.
- OCR are encouraging the use of short video clips, with sound bites (interactive dialogue) recorded as part of an E-Portfolio on a CD.
- If the preferred option is to continue to use a paper portfolio, digital photographs must be used and interactive dialogue must be presented in alternative forms which show positive response to opinions from others. Overlay sheets could provide an opportunity for comment without affecting the quality of candidate presentation.
- Communication in the new specification relates to the whole product study.
- Candidates should not over-enhance the background of design sheets.
- The use of Arial 10 pt (min) font should be encouraged –this is widely available and does not easily corrupt.
- For the new specification, prototype modelling should be fully integrated in to the development of creative ideas and ongoing evaluation. Different focus areas should respond with an appropriate balance of prototyping which suits the development of improvement for their selected product.
- It is important that all focus areas do respond with presenting an appropriate range of prototyped developments. One single 'final prototype' is not within the overall ethos of the specification.
- Many whole centres submit the work of all of their candidates in a form which can not be accessed with the equipment which most moderators use. It is absolutely essential that all individual CD's are trialled on an independent XP laptop to ensure that all video clips and sound files have been correctly transferred to the file. Candidates should be discouraged from using files from I pods, I tunes, and mobile phones if they are not compatible with a

standard PP presentation. If candidates work will not run on a moderators computer many hours of effort will be completely wasted as the work will not be seen.

- OCR has measures in place to try to view non standard files – This does however take up a disproportionate amount of time and success is not guaranteed.

Summary of Main Features for Unit F522

- Products can be selected from any of 8 different focus areas:
- Built Environment and construction, Engineering, Food, Graphic Products, Manufacturing, Resistant Materials, Systems and Control, Textiles.
- Work can be presented on 20 sheets of A3 paper or CD ROM equivalent to current OCR approved standard. (currently PP)
- Please consult the OCR guidance booklet for submitting E-Portfolios. In particular guidance on 'Pack and Go' or 'Package for CD' facility for PowerPoint. Videos will not work without this facility being used. This booklet stipulates acceptable formats and should be strictly observed.
- For the Product Study please do not over enhance backgrounds.
- Please use Arial font at least 10pt- This is widely available -can be read easily -does not corrupt.
- If video clips are used: 3-5 of no more than 20 sec. each would be appropriate. - Make sure they work from an individual CD on an independent stand-alone laptop.
- A candidate must submit either an A3 paper folder or an individual CD not both.
- A Centre can submit some candidates work as A3 paper folders and some as CD's.
- Centre and candidate name and number must be on all paper and individual CD's.
- CD's must have full details on both the outside cover and written on the actual CD.
- Work must be recorded in real time and digital technologies must be used.
- A 'real time' digital image of the product in use will be an essential feature.
- The ethos of the Unit remains the same: A single specific named product is selected and shown in use- a detailed description of the product is given together with needs of manufacturer and consumer. Key criteria are identified.
- The idea section and modelling are linked in a new section called 'Design Development'. The approach to this section will differ depending on the focus area studied by the candidate. The key thing is that the development is appropriate to the product and the focus area.
- The requirement to make a test rig is no longer necessary this has been replaced with the need to plan and implement an appropriate test on the final developed idea it is however still possible to submit one if it is considered an appropriate test.
- Communication skills now include the use of digital technology, and interactive dialogue candidates who fail to use these techniques should be marked in the lower bands.

F523 Design, Make and Evaluate

General Comments

Administration

The majority of Centres submitted their marks to the Moderator using the correct CSF forms, although Moderators needed to contact several Centres after the due date in order to obtain MS1 forms, CCS 160 Centre Authentication forms, or the coursework itself. There were a number of arithmetic errors, and some candidates' folders or CD's were not clearly labelled with Centre Number and Candidate Number. Significant difficulties were experienced by Moderators when trying to contact some Centres to resolve these issues, and in a number of cases this process took several weeks. Centres are asked to check all documentation before forwarding to the Moderator, and to respond promptly should any queries arise. OCR Interchange was used for the first time this session, and is a means of online communication between Centre Examinations Officers, OCR, and Moderators. Whilst this was effective in most cases, some Centres did not respond to email communications from Moderators sent through the Interchange system. Centres are reminded that moderation cannot take place until the Moderator has all relevant documentation in their possession. Where there are ten or fewer candidates, OCR instructions require the Centre to send the complete work of all candidates to the Moderator by the due date, and not to wait for the request from the Moderator.

The grid provided as part of the CSF form for Centres to provide a breakdown of marks from the 57 available in Section 4a was completed and forwarded to the Moderator in the majority of cases, sometimes following a request from the Moderator. The use of the grid was not a requirement this session, but it did assist the Moderation process where sent. In most cases it was used sensibly with the positioning of marks clearly related to the evidence in the folder. In a few cases it was difficult to see the relationship between the evidence in the folder and the relative positions of the marks for level of competency in each of the criteria.

Choices of Project

A wide range of project titles had been chosen by candidates that were appropriate to the requirements of the examination. The vast majority were 'Resistant Materials' based, with Graphic Products, Textiles, Systems and Control, Engineering, Food, Built Environment and Construction, and Manufacturing based projects following in decreasing numbers.

There was considerable variation in terms of complexity and demand. There were a high percentage of 'safe' (and fairly predictable) projects which led to 'standard' solutions, but it was refreshing to see some Centres and candidates taking on board the ethos of the new Specification to venture outside the comfort of a 'normal' project and tackle challenging design problems and explore and develop innovative solutions. Often the most inspiring work came from projects where there was a greater element of 'risk taking' and 'the unknown'. Many candidates seem to have a final design in mind from the outset of the project, and they should be encouraged to keep an open mind during the early stages of the project and be prepared to think iteratively towards truly creative and innovative solutions.

Whilst there were a number of large scale and sometimes over-ambitious projects which were often incomplete or not finished to an appropriate level of detail and quality, it was pleasing to see more focused and sensibly scaled projects this session. Projects that were realistic and manageable in the time scale allowed candidates to explore a range of options and then go on to refine their design before producing a high quality complete product commensurate with their abilities. However, in a significant number of cases the overall complexity of the projects as executed and the range and/or depth of skills involved in the design development, making and evaluating was insufficient for candidates to attain the marks awarded by the Centre. In these

cases adjustments were necessary to bring the Centres assessments into line with the OCR standard.

The correct choice of project is of supreme importance, and should arise from very careful consideration of the opportunities it presents (or does not present) against the Assessment Criteria for this Unit. Detailed discussions between the candidate and the teacher are essential before a project is embarked on which may disadvantage the candidate.

A New Approach and Emphasis

Most Centres had studied the new Specification and guidance for this Unit in detail, and had embraced the new changes and approaches. A small number of centres appeared to have continued teaching the legacy Units 2522 and 2523 with the addition of a marketing presentation. Clearly the latter approach resulted in not only superfluous work (such as time plans) being carried out by candidates, but many new requirements not being fully satisfied. The new Unit clearly encourages a more flexible and mature approach to designing which is fundamental to the subject. The new assessment framework recognises that true design is not constrained by specific requirements and procedures that must be followed. It allows marks to be allocated where there are different approaches to designing, thus accommodating the different material focus areas.

Some Centres found the more flexible, less prescriptive approach a challenge, along with the assessments which followed. A shift of emphasis from *'Has the candidate satisfied this specific assessment descriptor?'* to *'What level of skill and intellectual activity has the candidate displayed?'*

Centres' assessments tended to be optimistic in this first session for this Unit, some significantly so. The majority of Centres required adjustments to their marks to bring into line with the OCR standard, The OCR standard has been carried forward from the legacy OCR Units 2522 and 2523.

Generic responses to the assessment criteria were common, where responses did not relate directly to the specific project and which lacked the focus and relevant detail required at A2 level. Such work was often over-rewarded by Centres, where marks in the lower bands were more appropriate.

Given the specific inclusion of product marketing in two of the seven assessment criteria, it was disappointing that overall in most cases there was limited reference to marketing and the commercial aspects of design and manufacture throughout the project. The intention is that candidates design a product that meets a specific need and that would potentially hold its own in the marketplace and be a viable commercial possibility. This involves consideration of materials, design features, and quality aspects that are appropriate to manufacture, distribution, and sales in their widest context. In general, there were more genuine client-based projects and there was greater evidence of contact with clients and potential users throughout the whole coursework projects.

A significant percentage (27.5%) of the total marks for this Unit is allocated to three sections that follow the completion of the making of the product. Many candidates lost marks where there was insufficient time to adequately address these final important sections.

Candidates are recommended to structure their coursework portfolios to follow the assessment categories as far as possible, and to include a clear title on each page slide. Work should be presented in a logical chronological sequence, presented in real time. A large number of candidates' portfolios were presented in a jumbled, sometimes retrospective fashion. In such cases it was difficult to follow the process of design and to decipher the evidence presented.

ICT

Highly developed skills in a wide range of applications using ICT, CAD and CAM were seen, and Moderators noted the highly professional standard of work presented by many candidates. In a small number of cases, candidates had produced all design work electronically, ie using CAD, not using a pencil or pen at any point during the design process. Some making work was also almost totally produced using CAD/CAM. This is a reflection of technology, and it was pleasing to see a good level of complexity and depth being maintained in the designing and making process as a whole to satisfy the coursework requirements, as well as detailed evidence to support Centres' assessments.

There was widespread evidence of large sections of text and images downloaded or copied and pasted from the Internet. If relevant to the project, edited/annotated by the candidate, and correctly acknowledged, such extracts could earn credit, but in most cases they were not acknowledged. Centres and candidates are warned of the correct procedures and rules for the examination, and that the authentication statements signed by the Centre and candidate indicate that they *'have acknowledged all source materials in the work itself.'*

Some candidates followed closely the format of exemplar folios provided at INSET, including page formats and layouts, headings, and approaches to specific sections. Such an approach was often detrimental rather than beneficial. It is generally more appropriate for the format and structure of a candidate's record of their work to be influenced by the nature and context of the product being designed and the candidate's own design style and skills.

E-portfolios

Approximately one third of the candidates entered for this Unit used PowerPoint software to record and present their coursework as an electronic portfolio. This is a positive development enabling the use of a range of digital technology throughout the portfolio. However, in some cases difficulties were encountered by the Moderator and the following points should be closely noted by those Centres and candidates intending to submit e-portfolios next year. A number of checks should be made before posting the CD's to the Moderator. The Centre should be ready and prepared to send a hard copy (ie a print-out of the PowerPoint) to the Moderator should any difficulties arise.

- E-portfolios are moderated/marked 'on-screen' and the backgrounds used by some candidates made it very difficult to read the text or to decipher the sketches and drawings. A green font on a grey background, or yellow text on a white background, for example, left the text barely visible. In several cases, coloured text on a multi coloured background left large chunks of text effectively invisible.
- Scans of hand sketches, mostly for the ideas section, were often not clear enough, and sometimes hardly visible on the screen. Some 'ideas pages' had a grey background from the scanning process. Clear sketches are required prior to scanning. The use of the scan settings or basic image-editing software is often a way of redeeming faint scans. Photographs of design sheets in place of proper scans were not clear enough. Where this method has to be used, the use of the 'macro' setting on digital cameras (to focus close-up) may prove helpful.
- In some cases the font was too small to be read 'on screen' in Slide Show view. A clear font and a minimum size of 10pt, is advised. It is important that a standard font such as Arial is used to avoid compatibility problems when the PowerPoint file is opened on a different computer.
- Audio and video clips gave evidence of what candidates had done. Lengthy clips are unnecessary since a short clip gives sufficient evidence for the Moderator to confirm the level of thinking of the candidate.
- In some cases, videos in the PowerPoint presentations would not run when 'clicked', mostly where the actual video file had not been included on the CD. When saving to send to the Moderator, 'Pack and Go' must be used (or 'Package for CD' in PPT 2007). This

creates a folder in which the main PPT file is saved along with all the associated files, video clips, and links, etc. That folder is what is sent to the Moderator on CD.

- Many candidates helpfully named the main PowerPoint file 'OPEN THIS FILE'. This is recommended, and is likely to avoid confusion where there may be several PowerPoint files in the folder sent to the Moderator.
- Another point to remember is to include 'CLICK HERE for VIDEO' or a large 'PLAY' button clearly at the appropriate place. Some candidates helpfully included a key at the start of the portfolio so that the locations of videos were very clearly highlighted.
- The use of timings and animation caused delays where the Moderator had to wait for items to appear through a fade, or for images or text to 'arrive' on the screen. All timings and animation should be removed before copying final e-portfolios onto CD for forwarding to the Moderator.
- Large file sizes can be a problem. Several PowerPoint files exceeded 300Mb and took 10 minutes or more to open and settle on the PC before Moderation could begin. Where a number of high-resolution images or several videos were included on a slide, the transition to such slides often took over a minute. The resolution and/or quantity of digital images/videos on one slide should be kept to a reasonable level (without compromising clarity) and the 'compress pictures' tool within PowerPoint should be used to compress all pictures and reduce the overall file size of the PowerPoint.
- PowerPoint is the approved OCR format. Files should be saved in .ppt (PowerPoint Presentation) type/format. Files saved as .pps (PowerPoint Show) type/format presented problems in some cases where the moderator needed to look more closely at the candidates' work to verify the marks awarded by the Centre (eg where the font size was very small, or where the image quality was poor).
In a few cases, tables or spreadsheets had been copied and pasted or imported into PowerPoint. Where these tables extended beyond the edge of the frame of a slide it was not possible to see the whole table. In .ppt format the whole table can be made visible in 'Normal View' but in .pps format it cannot.
- Helpful hyperlinks from a contents page to the various sections were used by some candidates and this aided navigation.
- Whether paper portfolio or e-portfolio, all pages or slides should be numbered. This is standard professional practice in portfolios of this nature and an important indicator of attention to detail and quality of communication at this Advanced level.

Further guidance for the new Specification and the use of PowerPoint to present coursework will be given at the OCR Training Courses during 2010-11. Visit www.ocr.org.uk/training for more details.

Comments on Individual Sections

1 Design Brief 3 Marks

Present a design brief for a marketable product

All but a very small number of candidates presented a design brief that was reasonably clear in giving the direction for the project. There were a greater number of 'client/market-focused' design briefs this session, although there were too many 'candidate-focused' design briefs. It is important for the candidate to look beyond their personal needs to the needs of a specific client or user group, and beyond this to the appropriate issues relating to commercial production and the marketing of their product.

More photographic information of the chosen situation and context for the designing would be helpful, with an appropriate analysis of the problem or need. Candidates should not underestimate the value of a positive and enthusiastic start to the project where they show clearly the background to the project and the market potential for their product in its broadest sense. This section should include reasons why the project is worth doing, why it is needed, and the desired end result of the project.

Marketing is specifically mentioned in the assessment objective for this section, yet many candidates did not make any reference to the aspects of the design of their product that would need to be considered from a marketing perspective, or give reasons why their brief was likely to produce a marketable product.

A number of candidates included a 'client profile' in this section, giving detailed information about the client or user group. Where this was a specific named person or a clearly defined group it was beneficial in giving focus and direction to the project. Descriptions such as 'people who will want to use this item' and 'I am designing this item for people who use a desk tidy' had little value. By the time Section 1 is written it is expected that the candidate will have identified and met the client in person, or have made contact with a section of the target market. Initial discussions regarding the nature and direction of the project are likely to have already taken place, and background information obtained.

There is a wealth of data and resources available for candidates to research when choosing products, e.g. for food products, trends in eating patterns, obesity facts and figures, and lifestyles. If nutrition forms part of the design brief for a food product, the nutritional focus should be carried through the whole portfolio. It will require research in Section 2 and will form the basis for the design, development, and evaluation throughout.

The marking of this section tended to be lenient when compared with the OCR standard. The majority attained the middle mark band although a large number of candidates obtained maximum marks.

2 Information, Inspiration and Influences 9 Marks

Obtain information relevant to the design of the product Present a range of evidence to show the sources of inspiration and influences on the designing

The purpose of this section is for candidates to refine the brief, and to enable the compiling of a detailed list of requirements and features for the product in the following section, the Design Specification.

Many candidates had responded to the change in emphasis in the mark scheme from Unit 2522 to gather information more focussed and relevant to their design task. However, a significant number of candidates retained headings like 'design constraints' & 'moral issues' followed by generic information with little or no benefit to subsequent work. It is surprising how many candidates appeared to design 'in a vacuum' with little or no contact with their client or target market, and even more who remain uninvolved to this aspect of research which is so vital in commercial design practice.

A great deal of attention was given by candidates to the copying and pasting of internet images rather than real primary research to find inspiration, information and influences. The highest achieving candidates had researched using a range of techniques and sources and then used this section to develop their understanding of the issues that needed to be addressed or carried forward into the designing. At its worst, this section was a series of internet images with no annotation or evidence of the images being of any value to the project – a rather loose interpretation of inspiration. The use of mood boards was common.

Establishing the exact needs and requirements of the key 'stakeholders' in the product; e.g. consumer/user, manufacturer, distributor, and retailer, is crucial. Questionnaires were common, yet often generic in nature and of little real value to the designing to follow. Questions to potential users such as '*If there was a device to do this task, would you use it?*' or '*Is this product needed?*' are more appropriate prior to Section 1 and the writing of the design brief, with data or

results being included in that section in support of the product and its marketability. Questions in this section should relate to the specific nature of the problem and the specific requirements for the design. In the case of food products, specific qualities required should be elicited from potential users, beyond the basic 'attractive' and 'tasty'. Word banks are available with suitable terminology for sensory testing.

Candidates who earned the highest marks had investigated, at first hand, existing products and solutions, often disassembling them, and had included diagrams and sketches of the products and their features alongside close-up photographs. Looking closely at a small number of items is of significantly higher value than studying a large number of items at a distance, both in terms of the useful information which will be gained and the marks that can be awarded.

Candidates designing food products with a nutritional focus gathered limited information in this section. Researching the nutritional requirements of the user group is an obvious requirement. Inspiration for food products is not only possible from existing products but also culture, crops, seasons, nutrition and locality, etc. Factors affecting peoples' choice of food will influence designs, for example when, where, and how they will be eaten.

The absence of key information such as details and dimensions of items to be stored or fitted into the product, or details of the intended location for the product, or the legal guidelines or regulations which apply to their product, was prevalent. This is key information – the restrictions, limitations, and boundaries imposed on the product by various issues. If a product is to be used by a certain group of people, be stored in a certain location, or contain certain items, the details of the constraints arising from these factors (obtained by interviewing users, by measurement, or by consulting relevant documentation) should be clearly identified, analysed and presented by candidates in this section. Consideration of cost is a significant factor when designing marketable products, yet this aspect was rarely covered.

It was clear that some Centres had not grasped the rationale behind the mark scheme and had over-rewarded candidates' responses. Very high marks were frequently given when there was no primary research or 'personal-contact' investigation and little inspiration derived from the evidence. This resulted in Centres' marks being lenient in most cases in this section.

3 Design Specification 3 Marks

Produce a design specification for the product

Candidates' responses in this section mostly fitted the descriptor for the middle assessment box, with few candidates scoring full marks. The main problems were lack of detail and lack of justification evident from work carried out in Section 2. A large number of candidates used generic statements which could be cut and pasted from one project to another with no discernable relevance to the design specification they were about to start with.

For the highest mark to be awarded in this section, candidates must state detailed requirements by reference to specific aspects of the product, including technical, numerical, measurable targets. This will include sizes (eg maximum or minimum/range of adjustments, positions), capacities, weights, quantities, nutritional values, costs/budgets, performance, life span, and features required, wherever possible. Many candidates presented generalised unjustified points such as 'materials must be lightweight', 'materials must be good quality', 'must be aesthetically pleasing', and 'must be as cheap as possible' which could apply to any product, and which were insufficient to guide or influence the design work. Requirements listed by candidates included 'must be designed for the target market' and 'must suit the customer's needs'. By this stage of the project the specific target market or client should have been identified, and the specific needs requirements relating thereto determined

Design Specifications for food products were usually not sufficiently specific to the product being designed to meet the marks awarded by the Centre. Terms such as 'healthy' have little value

unless they are explained in detail. Wherever possible, numerical requirements such as 'Fat level below 6g per 100g' should be incorporated. It is anticipated that Design Specifications for food candidates will feature social, moral, cultural and sustainability requirements due to their specific relevance to this focus area.

The design specification acts as a clear framework for evaluation throughout the design development and the final testing, and as such should be given a higher priority by candidates. A clear Design Specification will maximise the likelihood of the product meeting the original need. It should reflect the manufacture and market potential for the product, and include performance criteria such as properties of materials and finish, and aspects of quality, standards, and reliability. Marketing and commercial aspects also need to be considered - key factors affecting the distribution and presentation of the product to potential purchasers, clients, or user group. These include reference to brand image, packaging, documentation, aesthetics, fashion, and current trends.

Centres' assessments in this section were broadly in line with the OCR standard.

4a Design, Design Development and Making 57 Marks

Demonstrate competence in the design, design development and making of the product, to include the following package of evidence:

- **the generation and exploration of design possibilities**
- **the use of digital technologies**
- **experimenting and modeling**
- **the refining and defining of a final design through ongoing evaluation, and**
- **the planning and making of the product**

Pages 53-54 of the Specification: 5.11 Coursework Administration/Regulations, state 'The intention is that assessment of the coursework project should not restrict, interrupt, or influence the natural flow and progression of the candidate's design, development and making of a product to meet a need. The assessment criteria should be seen as providing a framework for assessing the candidate's approach to key elements in that process, the appropriateness, depth and quality of their work, and the level of thinking shown. It is important that assessment does not interfere with the candidate developing and using skills naturally and instinctively, guided by the teacher...'

The assessment criteria for this section allow for flexibility of approach. Candidates are not limited or constrained to a prescribed approach. The package of evidence of the candidates work in this section should include evidence against all five key areas listed above. However, the balance and emphasis of work in these sub-sections will vary considerably between projects, particularly between material focus areas. Different types of products will involve different weightings of the five sub-sections. The overall mark should represent the 'best-fit' mark considering the skills required for that particular project. Some products will require extensive modelling and trials to arrive at a highly suitable outcome, for example food products. Other products may require less modelling but demonstrate high-level demanding making skills in the final product. Consideration of this should take place when determining the 'best-fit' mark in this section, where a professional judgement of the intellectual demand involved in the designing and making of the chosen product is crucial to ensure a fair and accurate mark. Clearly, the overall complexity, demand, and intellectual challenge involved in the designing and making will influence marks in this section. A simpler project will need to be carried out in greater depth to achieve the same marks as a more complex project.

The new specification and mark scheme for this Unit, along with the supporting online and printed resources now available to Centres, had a positive impact on the design work of candidates, a greater number of whom displayed a more integrated approach to designing. This

was evident with freehand sketches, 2D and 3D modelling including computer modelling and evaluative commentary used fluidly to communicate design thinking and a progression of design in a format and style suited to the candidate and their chosen product. In the best examples work was of a very high quality, standing direct comparison with the work of degree level students. A few centres continued with a linear assessment based approach of sketches, then models, then evaluation, then development, which meant that the flow of work appeared disjointed and lacked coherence.

A good number of candidates made regular contact with their client/target user group whilst working in this section, and in so doing were able to justify decision making more clearly. Some centres scheduled certain points at which this should happen, for example following initial sketches, or following the production of a computer 3D image or model. A few centres had encouraged candidates to set up small 'discussion groups' or 'design teams' where candidates were able to explain their ideas or models to other candidates for comment. Such approaches mirror professional design practice and centres should view them as good practice. Candidates who involved others in this collaborative way usually went on to develop more successful, fit-for-purpose solutions.

In many cases Centres had awarded marks in the higher band in this section where the designing and making tasks were not sufficiently demanding at A2 level. Products varied from those which were highly imaginative and of a professional quality and finish, showing real flair and creativity, to those which were more appropriate to GCSE coursework. In many cases the designs and the methods employed in the making of the product were very simple, sometimes rudimentary, yet were awarded high marks by the Centre.

In a number of cases there was limited photographic evidence of the manufacturing of the product and the processes involved. In some cases the images were too small to show the detail required. The allocation of two pages or slides is recommended, with the inclusion of several large photographs

The level of detail in design possibilities suggested was disappointing in some cases. With food products it is normal practice that a design starts with a recipe, which is then adapted to meet the needs of the user, in accordance with the requirements identified in the Design Brief and Specification. If nutrition is to be a feature, the product should be adapted to meet that need. There was little evidence of the consideration of shape, flavour, and development of texture, based on the results of ongoing sensory testing evaluation. Costing is an important element of design development and the food products moderated this session included little consideration of this in relation to the needs of the user group.

In general, Centres' marking in this section was lenient when compared with OCR benchmarking and standardising examples.

- **the generation and exploration of design possibilities**

Most candidates produced a useful range of initial design possibilities, although many showed little innovation or exploration and were based on fairly obvious commercially available designs. In the best examples, Moderators saw innovative and creative designs explored and developed through an integration of freehand sketching with informative annotation, CAD drawings, images and modelling, and 3D modelling. This often included images which had inspired the designs. The work of some candidates was truly exceptional and was inspirational to moderate. There was a considerable difference in intellectual demand between projects. Candidates choosing very simple products with little complexity must be aware that considerable design exploration and detail will be needed if their work is to achieve high marks. Greater attention to technical aspects would improve candidates' performance, as would consideration of marketing aspects such as packaging, along with wider consideration of commercial and manufacturing issues would enhance candidates' responses in this section.

Where a grid was submitted, Centre's assessments of the level of competency demonstrated by candidates in this section tended to be lenient when compared with the OCR standard.

- **the use of digital technologies**

Digital technology featured strongly in the majority of projects, with photography, scanning, image manipulation, 3D CAD animations and videos used in the portfolios, and a range of CAM used in the modelling and making processes. The use of digital technology by some candidates was of a professional standard, but the quality of photographic images was poor in some cases. A greater emphasis on real time recording throughout the project is needed by Centres and candidates to ensure there is sufficient and proper evidence for assessment. Candidates presenting their work in e-portfolio format usually made extensive use of video to do this. In general, the level of competency demonstrated by candidates in this section was accurately assessed by Centres.

- **experimenting and modeling**

Candidates are encouraged to 'work as though they were professional designers' and to model, sketch, and use ICT/CAD as required as they develop their project. A number of Centres followed a pattern set in the previous Unit 2522 and produced several pages of photographs of models at the end of the design. Overall, however, it was pleasing to see greater experimentation, trials, visualisations and simulations being used by candidates in an integrated way to test design possibilities and to 'push back the boundaries' of design, exploring new possibilities, and aiding the development and refinement of the design.

A variety of modelling materials were used appropriately, and laser cutting and engraving CAM equipment was widely used to produce a range of models. Many candidates had used Google's free-to-download 'SketchUp', and it was evident that many candidates had accessed this CAD software and developed skills in its use independently.

Some candidates benefitted from producing full size card models, often placing these in the intended situation or consulting their client for feedback.

Photographic evidence in this section was of variable quality, with blurred images in some folios. Centre's assessments of the level of competency demonstrated by candidates in this section tended to be lenient when compared with the OCR standard.

- **the refining and defining of a final design through ongoing evaluation**

This was the least well completed sub-section of Section 4, and, where the grid was submitted, the competency of candidates was over-rewarded in a large number of cases. Candidates generally began Section 4 well by showing a reasonable range of concept ideas and possibilities but many were then let down by not showing a true progression, development and refinement - explaining and justifying a final proposal. In a surprising number of cases, there was no definition of the final design solution. For high marks, a clearly defined final design is required, which, if it was sent to a distant manufacturer, would enable that manufacturer to produce the item exactly as intended. CAD working drawings with supporting annotation are appropriate. Whilst some responses were to a high standard of detail and complexity, CAD drawings were most often incomplete and lacked the detail that would have enabled a third party to manufacture the product. In such cases, a mark in the lower or middle band is appropriate.

It was pleasing to see evidence of candidates' collaboration with others to attain a high level of refinement and detail in their designing. Regular consultations with the client or user groups at key stages of the design and development will help to ensure fit-for-purpose outcomes.

Greater attention to technical aspects in the refining and defining stage of design development is needed to improve candidates' performance. Details of dimensions, materials, construction, ingredients, components, and fittings, are needed to access higher marks.

For food items, the manufacturing specification should include detailed recipes with specific quantities and nutritional breakdown. It should include sizes of components, quantities and depths of toppings, sauces, and fillings, and a HACCP (Hazard Analysis and Critical Control Points) chart to identify food safety issues in production and storage. Other details include allergy concerns and special claims (eg organic, vegetarian). Packaging and labelling details, including heating instructions where appropriate are important also.

For items to be printed, camera-ready artwork or print masters using suitable software should be included. A 3D outcome is required for part of the making for graphics products.

For textiles items, a detailed lay plan using suitable software should be included. This should include overall sizes of the pieces and the layout and positioning for the cutting of the fabric from the roll. Other important elements to include are: grain direction arrows, marks to show where parts match, seam allowances, and indication of scale.

Many candidates carried out the evaluation as a separate exercise. The real time evaluation of design development in the form of evaluative notes and comments alongside ideas, sketches and models is encouraged. Colour coding was adopted by many centres and this made the evaluation clearly evident for assessment purposes.

In general, Centre's assessments of the level of competency demonstrated by candidates in this section were lenient when compared with the OCR standard.

- **the planning and making of the product**

Most candidates addressed the requirement for planning with sensible plans and time issues. Some produced Gantt charts or several pages of manufacturing planning which provided more evidence than necessary. In many cases, planning was more of a retrospective log or diary of making in the case of most candidates.

There was a wide variety in the quality and scope of products. Centres' assessments were sometimes extremely generous with very high marks awarded to well finished but undemanding products. Relatively straightforward and simple products may sometimes be balanced by more demanding or complex supporting design and development work in the package of evidence presented for Section 4a, but often this was not the case. On the whole, Centres' marking was lenient when compared with the OCR Standard.

When marking candidates' work, a carefully considered judgement is required as to the level of skill that has been involved. Relatively simple making tasks - which have been completed with minimal planning and setting up, and a basic knowledge and understanding - should be awarded lower marks than more complex making tasks which have involved many stages of preparation and planning, detailed setting up, and a more advanced understanding and knowledge of the materials and processes involved.

Some products were extremely well constructed and finished and outstanding work was received from some Centres where the candidates had clearly enjoyed the making work and a good range of equipment and facilities had been utilised. There were some fine examples of contemporary products showing real design flair. Some projects such as desks for personal use were cumbersome and often did not give candidates the opportunity to develop advanced making skills. The quality of finish was often compromised when candidates attempted practical pieces that were too large.

Moderators commented on the lack of evidence by centres to support the making of the design. Many Centres failed to produce any 'real time' images of the development of the product and a final product magically appeared at the end of the folio. A minority of Centres used the section to clearly show the students creativity and skills and this supported the marks awarded.

It is not necessary for all stages of making to be recorded with photographs and text. For assessment purposes, a brief summary of the key stages, ensuring there is clear evidence of the candidate's level of thinking and depth of approach, is sufficient. Real-time recording is the key in this section, and there is no real substitute. The need for candidates to be organised and to keep a careful and detailed record as work progresses cannot be over-emphasised. Detail of every stage is not required but there should be sufficient evidence. The best responses included comments detailing what went well and diagrams of changes made.

There was increased use of CAD and CAM this session, laser cutters in particular. Centres need to ensure that candidates include strong evidence (eg in the form of clear digital photographs and stage-by-stage 'Print Screens') of their involvement in all stages of the process if the Centre marks are to be justified. Moderators expressed concerns over the quality of photographs, where details were often obscure.

For high marks to be awarded at this level, food products should show a high level of competency and skill in handling and processing food equipment and ingredients, with clear evidence in the portfolio. The final product should appear a high quality product. Centres generally provided limited evidence in this respect.

4b Innovation 15 Marks

Show Innovation

Many candidates had explored and incorporated innovative features into their designing and making. It was pleasing to see originality, creativity and design flair and to reward this appropriately. Often an unusual means of manufacture will contribute to the marks, as would a product from a candidate who has taken a well established design and re-ordered aspects of its design and making. Often a single innovative aspect, component, or method can demonstrate innovation.

Clear supporting evidence in the folder is crucial to justify the Centre mark. In many cases the Centre awarded a high mark in this section where there was no clear evidence to support the mark. One centre approached the issue by asked candidates to place an image of their completed product in the centre of a page or slide, to place a title "Why my product is innovative" and then to annotate the photograph to provide evidence. This may well have fallen short of rewarding candidates who had shown innovation during manufacture, for example, but the exercise of recording innovative elements is worth recommending.

In the majority of cases, the Moderator was in broad agreement with the Centre's assessments, although in some cases had difficulty finding evidence to support the Centre's high marks where a conventional design had been produced using conventional techniques.

5 Testing and Independent Evaluation of the Final Product 9 Marks

Show evidence of the testing of the final product against the specification

Identify and state strengths and weaknesses in the product

Respond to independent evaluation

This section and Sections 6 and 7 follow the making of the product. They account for 27.5% of the total marks for this Unit. In many cases it was evident by the quality of responses compared to earlier sections that candidates had left insufficient time to complete these three final sections adequately.

There are three required elements for candidates' responses if they are to satisfy the assessment objective. For the highest mark to be awarded, all three elements need to be covered thoroughly and in depth. In some cases the Moderator was unable to confirm the

maximum marks awarded by the Centre where candidates had not clearly stated strengths and weaknesses or responded to comments from an independent source. In a surprising number of cases, the candidate made no reference at all to the Design Specification, the specific targets against which the success of the final product should be measured.

Because they were running out of time, the work of some candidates was superficial and lacking detail and rigour. In the best responses, candidates went back to clients and obtained detailed feedback with recommendations for improvements. In the poorer scenarios candidates evaluated the work by including reports with no evidence of their authenticity. Centres often awarded high marks for what appeared to be detailed evaluations, but where there was no actual evidence of user testing, and statements made by the candidate were subjective and not based on fact. It was clear that some Centres had made a real attempt to get the right people to look at the work and to evaluate it in depth. Companies were often used to assess the work and to write a report or be interviewed.

Several projects this session resulted in models as the final design. This presented problems when it came to testing. Obviously rigorous physical testing is not appropriate in such cases (although some seemed to try this approach) and some tried to disguise the fact that the outcome was a model using clever photography to mask the overall size of the 'product'. A sensible approach to testing was taken by some to obtain comments from real experts in the relevant field of design to identify strengths and weaknesses in the product. If this approach to testing is likely to be needed it would be wise for the candidate to set up contacts early in the life of the project.

Overall, there were very few diagrams, charts showing results, or drawings of possible improvements. Photographic evidence was thin in many cases. As part of the testing and evaluation, the final product should ideally be subjected to many or all of the expected conditions that it would face during the phases of its life - its suitability in all situations and conditions in which it may be placed, used, consumed, stored, packaged, or transported. Where aspects of the final product are difficult to test, for example how long it might last or how well it might keep when stored, the opinions of experts and those with experience in the appropriate field are essential. Direct contact with the final product is required for testing and evaluation to take place. The evaluation of a product by any other means (eg a digital image sent by email) is very limited.

Food focus candidates carried out sensory testing, and this was very much part of the ongoing development of the product. Testing at the conclusion of the making can also include keeping qualities, reheating times, and storage.

Overall the responses by candidates to comments made by others were disappointing. This was particularly so in portfolios with a food focus. Responses should show clearly how the specific issues raised by independent testers will be addressed. Ingredients of food products could be changed and further tests carried out to establish their success or otherwise. Centres' assessments in this section tended to be lenient when compared with the OCR standard.

6 Marketing Presentation 15 Marks

Using appropriate techniques create a marketing presentation suitable for the final product

This section represents 12.5% of the total marks for this Unit, yet often suffered as a result of insufficient time following the making work. There were some quite superb responses with candidates producing quite sophisticated discussions of marketing strategies and worked-through examples of advertisements or marketing presentations for their product. These sometimes included videos or PowerPoint presentations showing the product in action, live online websites with product options and accessories, and a business plan for the company selling the product and future derivatives. At the other end of the scale candidates included simplistic and unrealistic suggestions with little detail or value, often simply producing a collage of existing advertisements that would be appropriate for their own product. Candidates who had not completed the making of their product were clearly at a disadvantage when it came to this section.

It is recommended that Centres make the teaching of the principles of marketing a higher priority. In a significant number of cases candidates did not show consideration of the basic aspects of product distribution, selling, and promotion.

A primary requirement of the marketing and promotion of a product is that it should appeal to and engage the attention of the specific target user group. In many cases, the marketing aspects and strategies were not appropriate in this respect. This is surprising given the availability and visibility of thousands of examples of products being marketed and advertised.

A number of food focus portfolios included detail of packaging for the products. This earned credit in this section, although further detail of food hygiene and preservation in the packaging design would have further improved the responses. Food packaging should always include legal requirements and nutritional values.

Many Centres gave the opportunity for candidates to present their product and their marketing strategy to the teaching group, which was then recorded on video. This usually proved to be a positive experience and sometimes highlighted real possibilities for a product to be marketed commercially.

Centres' marking of candidates' responses in this section were lenient in many cases when compared with the standard set by OCR. For marks in the highest mark band to be awarded, a thorough, in-depth coverage of all key aspects is needed, including designs for promotional materials such as posters, leaflets, advertisements, presentations, and websites. Responses covering a more limited range of aspects in depth, or a wider range in less depth, should be given marks in the middle mark band. Some guidance for this section:

- The identification of the 'Unique Selling Proposition' (USP) – the key features and characteristics that will appeal to the customer – should form the starting point for the Marketing Presentation. This might be its versatility, reliability, ease of use, or adaptability.
- Consideration of the '4 P's of Marketing' – Product, Price, Place, and Promotion will help to give structure to the marketing presentation.
- Analysis of suitable communication media for the promotion of the product should take place, and reasons given for the choice.
- Consideration of product identity and branding, relevance to lifestyle and fashion, and the target market are all important elements of the Marketing Presentation.
- Most products and companies have a 'logo' or trademark, and the font, style, or images to be used in the product's promotion and packing are specified. These are aspects to include as part of the marketing presentation.
- Pricing is an aspect of marketing and this should be considered alongside other details – establishing the likely selling price of the product, and how the product is 'positioned' in the market place.

- Packaging is an important aspect for all products – the presentation and protection of the product. Marketing presentations should consider key features such as finish, design and layout of boxes or containers where applicable, and aspects such as stacking and storage.
- Consideration of the form in which the product might be sold is an important part of marketing – is it sold ready to use, flat pack, multi-pack, retail or bulk pack, in different sizes, weights, or capacities...?

7 Review and Reflection 9 Marks

Review and reflect on the effectiveness of the designing and making process that led to the final product

Consider the possible wider implications and impact of the product, including possible future developments

There are three required elements for candidates' responses if they are to satisfy the assessment objective. For the highest mark to be awarded, all three elements need to be covered thoroughly and in depth. In some cases the Moderator was unable to confirm high marks awarded by the Centre where candidates had not considered the possible wider implications and impact of the product or suggested possible future developments.

The section was not fully understood by Centres and candidates. More considered thoughtful examples talked about the personal journey travelled by the student through the project and the possible future development and impact of the product that had been produced. There was a tendency for much of this to be unrealistically positive rather than an honest appraisal of the project as a whole. For many candidates this was a section that was rushed and which did not reflect the quality seen in other sections.

A greater emphasis needs to be placed on the section by Centres as it is the conclusion of the project. It looks back to evaluate the complete coursework project as a process and looks forward to consider the wider 'world context' of the product and its prospects.

Centres' assessments in this section tended to be lenient when compared with the OCR standard. Some guidance for this section:

- Candidates are encouraged to give an insight into the process of designing and making of their product and to be honest about what they genuinely learnt about overcoming problems.
- Life-Cycle Analysis (LCA) can helpfully be used to evaluate the complete life of the product and its wider impact, from its conception through manufacture, distribution and use, to its recycling or disposal. Factors such as energy consumption, use of raw materials and ingredients, water consumption, and creation of waste should be assessed.
- In assessing the wider implications of their product, candidates should consider the effects of the product beyond its immediate function and use, including moral, ethical, and sustainability issues, together with economic and manufacturing issues.
- Comments on the likely success of the product in the market-place should be included. Developments relating to potential industrial and commercial production are relevant here, and are best shown using annotated sketches or diagrams.
- In considering possible future developments, candidates should view their product as a prototype, and suggest what the next stages in its development might be. These might include quality improvement or design variations, both of which would benefit from diagrams to explain.

F524/01 Component 1

General Comments

(Reference should be made to the published generic mark scheme for this unit when reading this report.)

This was the first paper of the new style format. Candidates were required to answer one question from eight. The vast majority of candidates correctly complied and there were very few rubric errors.

The most popular question was Question 6 Resistant Materials. Large numbers attempted Question 4 Graphic Products, Question 5 Manufacturing and Question 8 Textiles. Although there were some excellent responses to Question 1 Built Environment and Construction, a number of candidates attempted this question without the technical knowledge or understanding to achieve the full mark range.

Parts (a), (b), (c) and (d) were common to all questions.

For part (a), most candidates were able to give at least two justified design requirements for the given product. A number gave generic requirements or brief, unjustified statements which did not receive a mark.

Many candidates achieved full marks for part (b). The most common correct responses were using customer questionnaires to identify needs and the use of user group forums.

The most common correct responses to part (c) focussed on quality control systems and third party testing such as BSI. Question 1: Built Environment and Construction candidates focussed on checks upon installations and structures and H&S legislation.

Whilst the majority of candidates achieved marks for correctly explaining the stages of Life Cycle Assessment for part (d), a significant number of candidates incorrectly explained the commercial stages of a product life cycle, making no reference to the environmental impact of the product. Some candidates gave a list of the stages with no explanation and could not achieve full marks.

Part (e) is a material focus area specific. With the exception of Question 5 Manufacturing, part (e) (ii) of F 524/01 included the instruction for candidates to 'Use a flowchart and/or annotated diagrams to support your answer'.

In most cases candidates made the decision to use annotated diagrams to ensure that they include sufficient detail to access higher marks. Some candidates produced very detailed and full flowcharts to include the same level of technical detail. A significant number of candidates however produced a flowchart with very limited detail to describe the given process, and consequently did not achieve good marks.

Part (f) was a 'discuss' question of which existing Centres are familiar with. Candidates were generally well prepared to raise and explain a range of issues and include supporting evidence or examples.

The mark scheme for part (f) has been amended to fit into a 'best-fit' assessment banding. Details of what is required for a Level 3 (6-8 marks) is shown below.
Clear, cogent and well-structured response with two or three issues well explained.
Good use of examples and additional evidence to support discussion.
Good use of technical vocabulary.

Report on the Units taken in June 2010

A number of candidates miss out on achieving full marks by not including additional evidence or examples to support their answer.

Further comments related to parts (e) and (f) are referred to in the Comments on Individual Questions.

Comments on Individual Questions

Question 1 Built Environment and Construction

Most candidates achieved at least 2 out of the 3 marks for (e) (i). They were able to correctly state an appropriate material but rarely gave two appropriate properties.

For (e) (ii), only a few candidates were able to provide the appropriate detail necessary to access the higher mark range.

Part (f) was generally well answered with the majority of responses focussing on specific energy conservation systems within buildings rather than the implications of energy conservation.

Question 2 Engineering

Although a limited number of candidates attempted this question, the responses to parts (e) (i) and (e) (ii) were generally very good.

Almost all candidates correctly identified a specific material and gave two appropriate properties. Some candidates used a combination of a flowchart with annotated diagrams to produce excellent full and detailed descriptions of the process to manufacture the drive shaft. All included details of quality control checks.

There were a number of excellent answers to part (f) with some candidates looking at the cost and training implications and the effect upon quality. Some candidates focussed only on the loss of jobs and did not access the middle or higher mark bands.

Question 3 Food

There was a very limited response to this question.

Question 4 Graphic Products

Most candidates gave a material with two appropriate properties for (e) (i). Some candidates however named card as a material but did not give a suitable property.

Whilst there were a number of excellent answers to (e) (ii), a significant number produced very brief flowcharts, lacking in detail.

The best responses made good use of annotated diagrams, in some cases as part of a flow chart, to fully describe the manufacture of the folder. Some candidates did not take into account the volume of production.

Relatively few candidates achieved the higher mark bands for part (f). The best responses looked at issues related to reductions in wastage and chemical usage and lower power consumption of modern print systems. A large number of candidates focussed solely on job

losses and did not access the full mark range. Some incorrectly suggested that there would be an increase in power and material usage.

Question 5 Manufacturing

This was a popular question with a number of excellent responses. Almost all candidates identified an appropriate material with appropriate properties for (e) (i).

There were a few excellent responses to (e) (ii). Candidates produced fully detailed flow charts (including appropriate sketches) of the injection moulding of the handle, including details of the attachment of the mild steel inserts. Virtually all candidates included quality control checks. Whilst there were a number of excellent responses to part (f), a large number of candidates referred to the introduction of ICT systems rather than the implications of Computer Integrated Manufacturing.

The best responses discussed issues relating to the centralised control of computer systems, improved output and better quality control systems.

Question 6 Resistant Materials

The most popular question with a wide range of responses. There was a wide range of materials proposed for (e) (i), the most common being acrylic, stainless steel and aluminium. Virtually all candidates were able to give two appropriate properties.

Some responses to (e) (ii) were outstanding; fully detailed methods describing the production of a batch of 50 000 toast racks and including details of the specialist tooling required.

Some candidates described workshop methods that would not be appropriate for a large batch. Many candidates produced very good quality responses to part (f), a significant number achieving full marks. These responses focussed on issues such as the effect on customers, the need for change of material and/or production processes and initial cost implications.

A number of candidates focussed on generic environmental issues, ignoring the implications to manufacturers, and consequently did not access the middle or higher mark bands.

Question 7 Systems and Control

Almost all candidates were able to state an electronic component/sensor that could be used on the exercise bike and produced a labelled sketch to show how it could be used for (e) (i).

Part (e) (ii) was answered well by the majority of candidates. Those who used annotated diagrams were able to clearly show a method of producing a mechanical pedalling resistance. Some candidates used a flowchart to present their response but did not include sufficient detail to fully describe a method.

There were some excellent answers to part (f). Many candidates looked at the sensitive ethical issues related to fitness and the inclusivity of designing equipment for as wide a range of consumers as possible.

Question 8 Textiles

A very popular question with a number of very good responses.

Report on the Units taken in June 2010

Most candidates identified an appropriate fabric for making the oven mitt although a number were unable to give more than one appropriate performance characteristic for part (e) (i). Many responses to part (e) (ii) were full and detailed and were a combination of flowchart and annotated diagrams.

Answers to part (f) were generally good. Some candidates produced excellent responses, looking at a wide range of issues such as the use and disposal of harmful chemicals, fibre production (pesticides etc) and the need to consider recycling and bio-degradable textile products.

Some candidates produced generic environmental responses with limited relation to textiles, and consequently did not access the full mark range.

F524/02 Component 2

General Comments

(Reference should be made to the published generic mark scheme for this unit when reading this report.)

It would help examiners if Centres encouraged candidates to circle the question number attempted on the first answer sheet and to write their name and candidate number on each answer sheet. It would also be helpful if Centres did not fasten the answer sheets together but simply placed them inside the folded cover sheet for each candidate.

Work of Candidates

This is a demanding unit allowing a synoptic assessment of a candidate's ability to design creatively whilst considering the practicalities of the needs of both user and manufacturer. The more able candidates cope impressively, showing awareness of the wide range of factors that will influence the success of a product and drawing on knowledge and skills from all units of the course.

Candidates are free to choose any of the questions even though each question is associated with a specific focus area. It was clear that many candidates took advantage of this freedom and answered a question that was outside the area for which they had been prepared. In many cases this resulted in poor marks in some sections because of the lack of appropriate technical knowledge that would be needed to manufacture the product.

In general candidates completed this paper fully with relatively few showing any indication of poor time management. A very small number of candidates had used extra sheets in their responses. This is strongly discouraged because part of the challenge of the paper is to communicate effectively and concisely. Candidates who use extra sheets tend to lose their focus on the requirements of the paper and ultimately score less well than those who work within the allotted space.

Comments on each of the marking criteria

Specification Points (S)

Candidates are asked to write three specification points. To be awarded full marks each point must be directly relevant to the brief and justified in relation to the function of the product, the potential user or the manufacturer of the product.

Unfortunately many candidates lost marks in this section by simply repeating information given in the question or making generic points relating to issues such as the need to be cost effective, aesthetically appealing or ergonomically suitable. Factors such as these are relevant to *all* products so to be given credit in this section they must be carefully justified indicating more precisely how each would influence the design of the product.

In future candidates are strongly advised to consider the key functional aspects of the product when writing their specification points.

Range of Ideas (R)

To achieve high marks in this section there are two complementary demands: firstly to produce a number of different concept solutions to the design brief set in the question, secondly to develop each concept to show details of possible alternatives and to consider how modifications could better suit the needs of user and manufacturer. Particular credit is given for innovative ideas that show an original approach to the design brief.

The majority of candidates performed quite well in the first of these demands but many failed to reach the higher marks because they showed little if any evidence of development beyond the initial concept. In a few cases ideas presented were unrealistic with little prospect of fulfilling the design brief. High marks cannot be awarded for ideas that are completely unsuitable, with little or no prospect of satisfying the set brief even if a suitable number of different ideas are present.

Less able candidates simply presented a broad outline of initial ideas that frequently were based on established commercially available products.

Technical Detail (D)

Assessment of this criterion was based on three strands:

- Consideration of methods of construction, assembly or manufacture.
- Understanding of suitable materials, components, or ingredients.
- Details of dimensions or quantities.

At this level of examination candidates are expected to have detailed knowledge of construction, assembly and manufacture of commercial products from their focus area and to be able to relate this knowledge to their own design proposals. The more successful candidates showed good subject knowledge by offering realistic options for construction and justified choices of materials by reference to their properties and performance. In some cases suggestions for construction and materials were inappropriate whilst a significant number of candidates made no reference to specific materials or construction details at all. No credit can be given for generic terms such as 'wood', 'metal', 'plastic' or 'card'.

In most cases dimensional detail was somewhat sparse with relatively few overall dimensions given. For full credit in this area at least some more detailed dimensions must be given, for example thicknesses of material or sizes of standard components that would be used to produce the product.

Evaluation of ideas with reference to specification and volume production (E)

This was done well by some candidates who considered how the product would be manufactured and used and drew attention to both positive and negative aspects of their designs.

Unfortunately in many cases comments were summative rather than evaluative becoming simple statements that did not show any evidence of balance in value judgement.

A few candidates used summary tables to evaluate their ideas, often with simple ticks or crosses, or scores out of ten to show success or failure. This should be discouraged because it does not allow the candidate to show the depth of thought necessary for high marks at this level.

Final Developed Outcome (F)

In this section candidates are asked to 'sketch a final developed outcome' and to 'justify key design features'. Most candidates presented a final idea, chosen from the previous section, with varying degrees of development evident. Most also identified specific features that would be included but many then lost marks by failing to justify why those features would be appropriate.

Communication (C)

The mark awarded for communication is based on a combination of factors:

- The overall clarity of presentation evident in the layout of the three design sheets of the paper.
- The range and quality of graphical skills evident.
- The use of clear annotation which communicates the quality of the candidate's design thinking.

When preparing for this unit it is important that candidates practice the use of a range of graphical techniques (for example 2D and 3D sketching, cross sections, exploded views) and the appropriate use of these to show construction and assembly detail.

Techniques of annotation (for example using arrows to connect comments to specific points) avoiding long passages of text would also help candidates communicate speedily and effectively.

The more able candidates showed impressive skill, managing to communicate broad concepts whilst also including useful detailed sketches and notes on clear, attractive sheets.

Comments on Individual questions

Question One: A shelter to protect students from the weather (Built Environment and construction)

This was a question frequently answered by non-specialists who lacked the knowledge to give appropriate details of materials and construction. For example, the brief stated that the shelter must be a permanent structure yet most candidates neither showed any form of foundation nor even considered the way in which the structure would be connected to the ground.

Question Two: An adjustable security grid (Engineering)

Whilst this question challenged the ability of candidates to think creatively and innovatively those answering the question showed good understanding of materials and construction. Proposed designs also tended to be practical and well detailed.

Question Three: A new range of products that will be suitable for children's parties (Food)

In general candidates answering this question produced a good range of ideas with very good detail of the ingredients needed to manufacture them. In most cases marks were lost because insufficient information was given about quantities of the ingredients and the processes that would be used to combine and cook them.

Question Four: A colourful external display for a community centre (Graphic Products)

This was a popular question answered well by some candidates who combined innovative thinking with consideration of practicality. Unfortunately many candidates lost marks because

they focussed on the design of the logo for the community centre and the layout of the display board and did not consider any of the practical details necessary for a successful exterior display.

Question Five: A seat that can be folded for ease of carrying (Manufacturing)

Understandably most candidates answering this question were strongly influenced by existing products with which they were familiar. In some cases this led to extremely complex folding mechanisms that candidates struggled to represent in sketches.

Question Six: A free-standing product that will accommodate outdoor clothing and accessories (Resistant Materials)

Many candidates attempting this question managed to propose a range of different ideas that considered the practical needs of the user. A significant number of candidates based all their ideas on a theme, often trees, which produced interesting shapes: unfortunately the candidates rarely had sufficient technical knowledge to show how the product could be manufactured.

Question Seven: An exercise machine that will develop and improve arm and upper body strength (Systems and Control)

Most candidates answering this question focussed on the requirement to monitor progress during a programme of exercise. This tended to lead to simple counting devices rather than considering the product as a whole that may have given greater scope for creativity and innovation.

Question Eight: A re-usable compact bag (Textiles)

Most candidates answering this question proposed surprisingly conventional solutions, tending to concentrate on the need for a fashionable image rather than opportunities for innovation. More able candidates considered a number of practical requirements such as security and ease of access to produce more thoughtful responses.

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