



Examiners' Report

Lead Examiner Feedback

January 2021

Pearson BTEC Nationals

In Engineering (31708H)

Unit 3: Engineering Product Design and
Manufacture

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Introduction

Unit 3 (Engineering Product Design and Manufacture) is a mandatory synoptic unit that requires learners to complete a set task to redesign an engineering product. There are five activities to complete for the whole task. This was the seventh live task for this unit and learners were required to redesign an aluminium foil tape dispenser.

The external assessment task is structured to address the assessment outcomes for the unit. The assessment outcomes are:

AO1: Demonstrate knowledge and understanding of engineering products and design

AO2: Apply knowledge and understanding of engineering methodologies, processes, features and procedures to iterative design

AO3: Analyse data and information and make connections between engineering concepts, processes, features, procedures, materials, standards and regulatory requirements

AO4: Evaluate engineering product design ideas, manufacturing processes and other design choices

AO5: Be able to develop and communicate reasoned design solutions with appropriate justification

There is a marking grid for each of the five activities that make up the whole task. The examiners allocate marks to the assessment evidence provided by the learners, for each of the five activities, using a holistic 'best-fit' approach. They compare the evidence for each activity to the corresponding marking grid and the bands/strands/descriptor bullet points within.

Please note that all of the examples of learner assessment evidence provided in this report are extracts. As a result, they can only be considered to be representative of evidence that would be awarded a mark from a certain band. In reality, all of the assessment evidence for a given activity (which is generally quite extensive) must be considered when awarding a mark for that activity.

Learners are required to submit the Part B task booklet for marking. Any extra pages of assessment evidence must be headed with the appropriate activity number and securely fastened into the correct place in the task booklet using a treasury tag. This should be avoided wherever possible, as the space available in the task booklet, for each activity, is more than sufficient. Learners should not submit any of their research notes, the Part A documentation or the Part B Information Booklet, as none of the aforesaid are considered when marking.

Introduction to the Overall Performance of the Unit

Pleasingly, the majority of learners appeared to find the task accessible. The examiners were able to award a suitable range of marks for each of the activities and across the task as a whole.

The written content provided by learners was again highly varied, but many attempted to structure their responses with sub-titles for certain activities (such as Activities 2, 4 and 5) and this should be encouraged.

Similarly, the sketches/drawings provided by learners varied in quality; however, most were legible, drawn in three dimensions and communicated the proposals/solution to a suitable standard. For example, isometric drawings with explosions and reasonable attempts at orthographic projections for Activity 4 were often evident, which is to be encouraged. In addition, most sketches were annotated with a commentary rather than labels, and again this is to be encouraged.

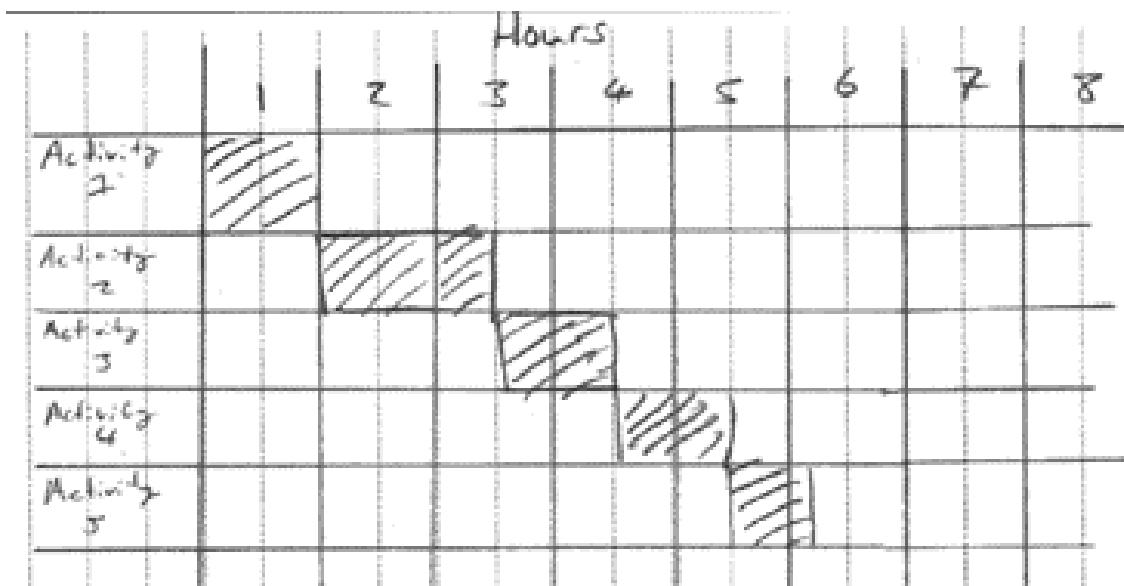
It was again not always obvious that learners had used their research, collected during Part A, in the most appropriate manner. For example, the Part A Set Task Brief advised learners to carry out research on existing designs for tape dispensers. In general, there were some generic and/or specific comments about the features of existing tape dispensers in the assessment evidence for Activity 4; however, actual sketches or diagrams showing how certain features (of existing tape dispensers) had been incorporated into the learner's solution were again seen infrequently. In addition, it was again not clear that learners had researched sustainability at all stages of the product life cycle, as most responses simply focused on recycling and/or re-use. Nonetheless, it was again pleasing that many learners clearly did use their research when commenting on the suitability of materials and manufacturing processes in Activity 4.

In the most part, suitable responses were seen for Activities 2, 3, 4 and 5; however, many learners are still providing an unsuitable response for Activity 1. Learners' responses to all of the five activities that make up the whole task are considered in the next parts of this report.

Activity 1 - Planning and design changes made during the development process

This activity is designed to test the learner's ability to forward plan and to review/justify the changes made during Activities 2 to 5, in order to fulfill the requirements of the Part B Client brief. The assessment focus is to 'Carry out an iterative development process'.

Many learners (including those of a higher ability) again seemed to interpret this activity as simply requiring a generic time plan and retrospective diary/reflective log, which mainly resulted in marks from Band 1. For example:



what changes were made during each session:

- developed 3 new redesigns of the current product (session 1)
- developed final idea during session 2, was a mix of a couple initial ideas

To gain higher marks, learners should (please refer to the Activity 1 marking grid):

- Provide a more detailed outline time plan that refers to the product being redesigned (in this case, an aluminium foil tape dispenser). In Extract 1, the overall plan includes more detail than the Gantt chart above but is still very generic with no focus on the product to be redesigned and therefore it is still not representative of Band 3 evidence. Given that learners have a period of time to undertake research (for Part A) before they are provided with the Part B task, the initial plan should also refer to how the said research will be applied during Activities 2 to 5.
- Generate action points for the next session at the end of each session as part of Activity 1. The said action points should show forward planning that is clearly linked to the specifics of the product being redesigned, with some consideration of what happened in the previous session. Action points such as 'In the next session I will design four ideas' will not gain much credit. In Extract 2, the learner has generated an action plan for an upcoming session; however, this type of response is not representative of Band 3 evidence as the said plan could be for any product and lacks specific content related to the redesign of the tape dispenser. For example, a statement such as 'I will take features from designs in Activity 3, such as the ruler, serrated edge and tension bar forward and combine into a better final solution, as they will mean the product can meet the client brief' would be representative of Band 3 evidence.
- Justify the changes made throughout the development process to fulfill the requirements of the Part B Client brief. In Extract 3, the learner has provided some suitable reasons for adding extra features to a design as part of Activity 3. This type of response is representative of Band 3 evidence.

Extract 1 - An initial outline time plan

| 10 - 11 = Hour 1 | 11 - 12 = Hour 2 | 1 - 2 = Hour 3 | 2 - 3 = Hour 4 |
|---|---|--|---|
| <ul style="list-style-type: none"> Project time plan and the specific action points for the next activities Look at numerical data given for analysis | <ul style="list-style-type: none"> Interpreting the client brief and analysing the requirements Update the time plan if necessary | <ul style="list-style-type: none"> Come up with initial ideas that will help to optimise the original design (3 or 4) and re-iterations | <ul style="list-style-type: none"> Complete the rest of the initial ideas (3 or 4) as well as developing the final solution. |

Extract 2 - An action plan for an upcoming session

Action plan for next session
 In the next session I will use my initial planning and ideas to develop a final design for my product and analyse the design considering costs, sustainability and the best uses of materials and manufacturing processes for producing it.

Extract 3 - A change made during a session

I added small blades on edge of table to cut the foil table easily and I know it makes increase of health and safety risk but also added the safety cap on it which is minimise the health and safety risks.

The format of the assessment evidence provided for Activity 1 again varied greatly. The evidence required for Activity 1 should be provided in the following format:

- An initial outline time plan in a table that is specific to the product being redesigned (this must not be generic and should not simply reiterate the statements underneath each activity heading in the task booklet)
- Action points for the upcoming session/s that are specific to the product being redesigned (these must not be generic and should not simply reiterate the statements underneath each activity heading in the task booklet)
- Changes made during the session/s that are specific to the product being redesigned (not generic) and justified

The latter two bullet points can be repeated as many times as necessary. This type of format will allow learners to provide evidence that shows they have addressed each of the strands in the Activity 1 marking grid. As Activity 1 is worth 6 marks from 60 marks available overall, learners should provide an overall response that is succinct but pertinent.

Activity 2 - Interpret the brief into operational requirements

The command word used in this activity is 'interpret'. Learners are required to identify clearly the key features of the Part B Client brief, and to use the aforesaid and the other information available (including the numerical data and the drawings provided in the Part B Information Booklet), to produce a set of suitable and cohesive operational and product requirements. In so doing, learners must also consider and make relevant comments on opportunities and constraints and key health and safety, regulatory and sustainability factors. The assessment focus is 'Interpreting brief into operational requirements'.

The vast majority of learners attempted this activity and a wide range of responses were seen, resulting in a full range of marks across Bands 1 to 3.

In this series, the following characteristics were often evident in the response from learners that gained lower marks for this activity:

- The interpretation included a lot of simple repetition from the Part B Client brief.
- Actual calculations were not present but a basic (or sometimes inaccurate) interpretation/conclusion was evident based on a simple review of the data in Figures 1 and 2.
- The consideration of health and safety factors was generic/irrelevant (not specific to the context) and may have referred to, for example, HASAWA 74, PPE, using safe machinery during manufacture etc.

Conversely, the following characteristics were often evident in the response from learners that gained higher marks for this activity:

- The interpretation included numerous comments that extended the Part B Client brief, for example, 'The redesigned dispenser should include methods to measure the tape, for example a built-in ruler, and to cut it, for example a serration, so extra equipment (like shears) isn't required, and some way of making the edge of the tape easy to find and pull through straight so there is less waste, for example by using a location bar that also prevents side to side movement of the tape when being pulled'.
- Some straightforward calculations or graphs were present; in addition, suitable interpretations/conclusions followed from them, for example, 'A

larger pulling force has a negative impact on the lifecycle of the tape dispenser, so I could try to include some form of mechanical advantage in the redesign'.

- Sustainability factors were normally considered; in addition, health and safety factors were commented on in context and usually extended the Part B Client brief, for example 'If using a serration or a blade in the redesign to cut the tape it will need to be covered to prevent the user accidentally brushing their hand across it, and the dispenser table could include finger grooves so that the user knows exactly where to place the hand that isn't pulling the tape, meaning it won't get caught or trapped.'

The following extracts show examples of some of the aforesaid characteristics (please refer to the Activity 2 marking grid):

- In Extract 1, the learner has interpreted the Part B Client brief and has considered feasible opportunities/product requirements (that are specific to the tape dispenser) in relation to one of the bullet points at the bottom of the Part B Client brief. This type of response is representative of Band 3 evidence, as the suggested requirements are cohesive and consider enhanced product performance.
- In Extract 2, the learner has taken data from Figures 1 and 2 (in the Part B Client brief) and has generated a (not always accurate) mean average for the amount of years that tape dispensers A, D, E and F would last; however, no interpretation of the data is present. This type of response is representative of Band 2 evidence; for Band 3, the learner needs to generate an accurate conclusion from an interpretation of the data, with some indication of how the said conclusion might affect the redesign in a positive way.
- In Extract 3, the learner has made some comments about health and safety factors that have little relevance/specificity to the product in hand; the said comments are generic and just reference the basics of health and safety legislation and the use of personal protective equipment. This type of response is representative of Band 1 evidence.

Extract 1

- Have a device that cuts the tape easily ~~while~~ while leaving a straight, clean edge.
- A device such as a ruler could be added next to the dispenser table so the user can easily get the length of tape they require without wasting any materials.
- A ~~small~~ smooth surface before the cutting device so the tape is free to slide so the user doesn't waste time trying to find the ~~right~~ edge of the roll.

Extract 2

| Data Analysis - Shaft material | | |
|---|--|---|
| highest force for each tape type | Max pull force used to dispense tape (N) | life ^{average} cycled to failure (in years) - ^{dispenser} shaft |
| $\varnothing = 150\text{mm}$ $W = 95\text{mm}$ ABS | 15 | 1.67 |
| $\varnothing = 150\text{mm}$ $W = 95\text{mm}$ LCS | 16 | 2.79 |
| $\varnothing = 100\text{mm}$ $W = 50\text{mm}$ ABS | 10 | 1.67 |
| $\varnothing = 100\text{mm}$ $W = 50\text{mm}$ LCS | 11 | 4.11 |

Extract 3

When the new dispenser is being manufactured, the rules and regulations (Health and Safety at Work Act) will/must be followed. Following these rules will ensure

that the manufacturers are safe and protected in their working environment.

PPE, which comes from PUWER, will also ensure that workers are protected from the machinery/processes and it will reduce the chances of accidents and emergencies.

The format of the assessment evidence provided for Activity 2 varied; nonetheless, the majority of learners that performed well on this activity:

- Extracted and then provided a list of all the issues and relevant operational requirements from the Part B Client brief
- Carried out some calculations/generated some graphs based on the numerical data and then provided some comments/conclusions to interpret the results and suggest some associated product requirements
- Generated a series of contextualised comments in bullet point form under a series of sub-titles that related to product requirements, opportunities/constraints, health and safety and regulatory/sustainability factors; in addition, the said comments were mostly justified in relation to the issues and operational requirements identified from the Part B Client brief

This type of format allowed learners to provide evidence that showed they had addressed each of the strands in the Activity 2 marking grid. As Activity 2 is also worth 6 marks from 60 marks available overall, learners should again provide an overall response that is succinct and pertinent.

Activity 3 - Produce a range of initial design ideas based on the client brief

Activity 3 requires learners to produce a range of (three or four) initial design ideas based on the Part B Client brief and their outcomes from Activity 2. The unit specification ('Key terms typically used in assessment') states that a design is 'a drawing and/or specification to communicate the form, function and/or operational workings of a product prior to it being made or maintained'. Activity 3 in the task booklet directs learners to use a combination of sketches and annotations; as a result, both must be present in order for learners to be able to achieve higher marks. The assessment focus is 'Initial design ideas'.

Again, the vast majority of learners attempted this activity and a wide range of responses were seen, resulting in a full range of marks across Bands 1 to 3.

In this series, the following characteristics were often evident in the response from learners that gained lower marks for this activity:

- The initial design ideas looked very similar to the original tape dispenser (a deliberately poor design) and/or each other, with just one or two small adaptations that were minor improvements and addressed just one or two of the bullet points at the bottom of the Part B Client brief.
- The initial design ideas did not take into account that the dispenser table could not be redesigned and/or did not include, for example, slots for the dispenser shafts to remove the need for the dispenser plates to be detached/reattached using screws (a relatively straightforward improvement).
- The annotation was fairly limited (but technically accurate in the main) and covered the learner's thoughts about the positives and negatives of each design idea without much reference to the bullet points at the bottom of the Part B Client brief, for example, cost may have been a focus.

Conversely, the following characteristics were often evident in the response from learners that gained higher marks for this activity:

- The initial design ideas were feasible, fit for purpose and reasonably different to the original tape dispenser design and each other, when

considering both form and approach; in addition, they included adaptations that were major improvements when compared to the original tape dispenser and at least three/four of the bullet points at the bottom of the Part B Client brief.

- The initial design ideas took into account that the dispenser table could not be redesigned (as stated in the Part B Client brief) and included improved features related to, for example - a) measuring the tape; b) cutting the tape; c) locating the end of the tape; d) ensuring that the tape is dispensed parallel/cut at a suitable/comfortable/appropriate angle; and d) using a modular extension table to accommodate both rolls of tape.
- The annotation was technically accurate and covered the learner's thoughts/rationale about each design idea with some reference to four of the bullet points at the bottom of the Part B Client brief; however, generic/irrelevant comments about aspects such as aesthetics and extensive explanations related to manufacturing processes (which is a focus of Activity 4) were sometimes evident and gained no/less credit.

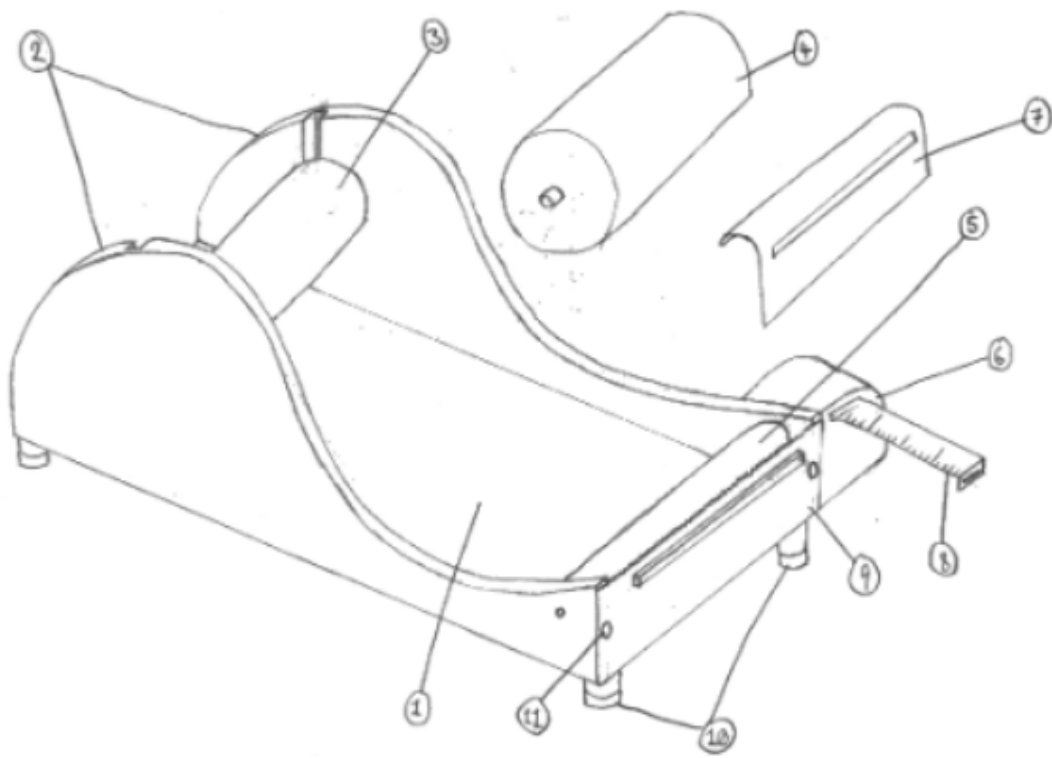
The following extracts show examples of some of the aforesaid characteristics (please refer to the Activity 3 marking grid):

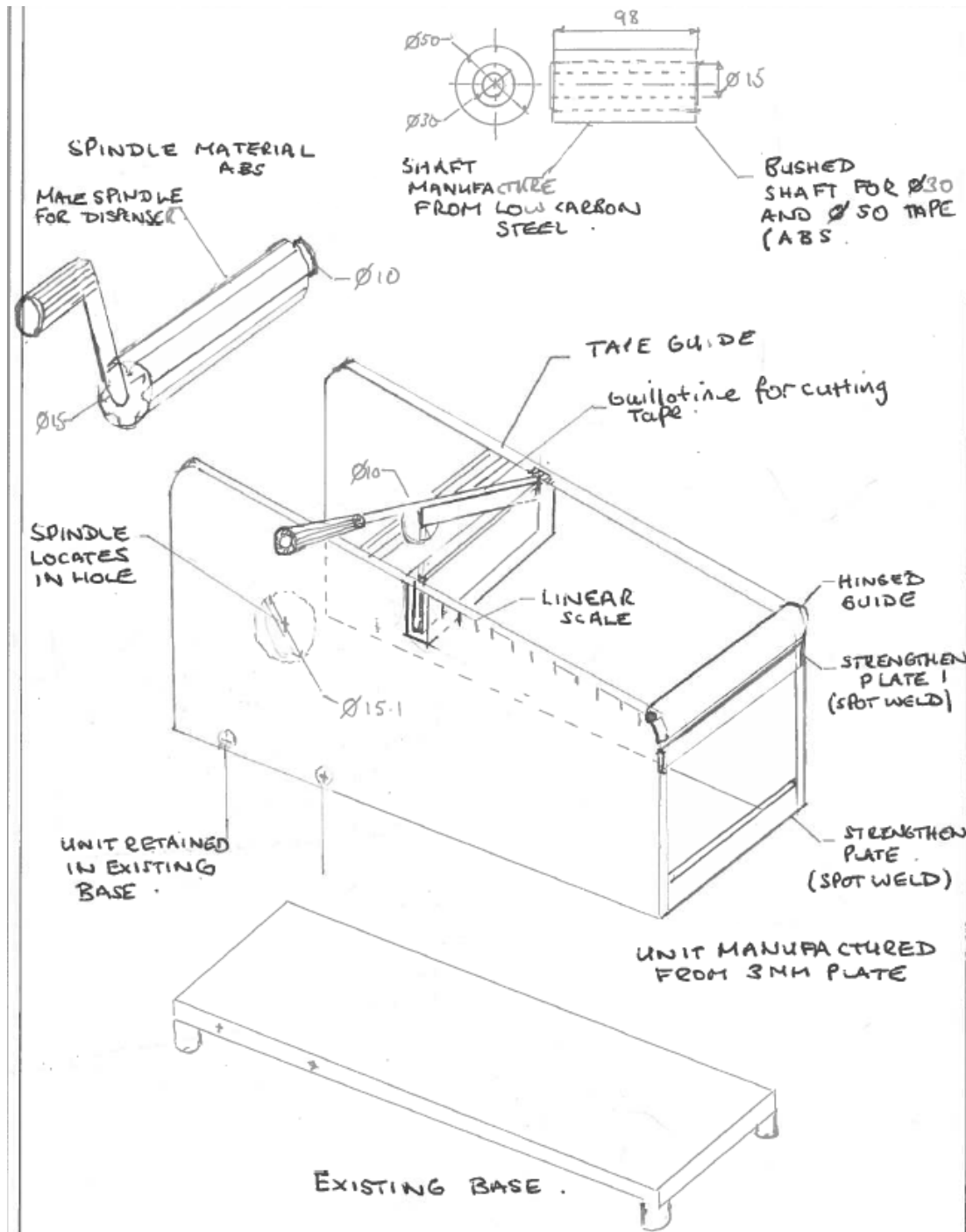
In Extracts 1a and 1b, the learners have generated ideas that comprehensively address the Part B Client brief. They both include features that are major improvements when compared to the original tape dispenser. In addition, they are both generally feasible and fit for purpose, and different to the original tape dispenser, when considering both form and approach. These types of response are representative of Band 3 evidence.

In Extracts 2a and 2b, the learners have provided annotations to communicate further detail and to explain a design idea with some reference to suitable product requirements that have been derived from the Part B Client brief. These types of response are representative of Band 3 evidence.

In Extract 3, the learner has generated an idea that includes one useful improvement (slots for the dispenser shafts) when compared to the original tape dispenser; nonetheless, the idea is still very similar to the original tape dispenser (a deliberately poor design) and therefore this type of response is representative of Band 1 evidence.

Extracts 1a and 1b



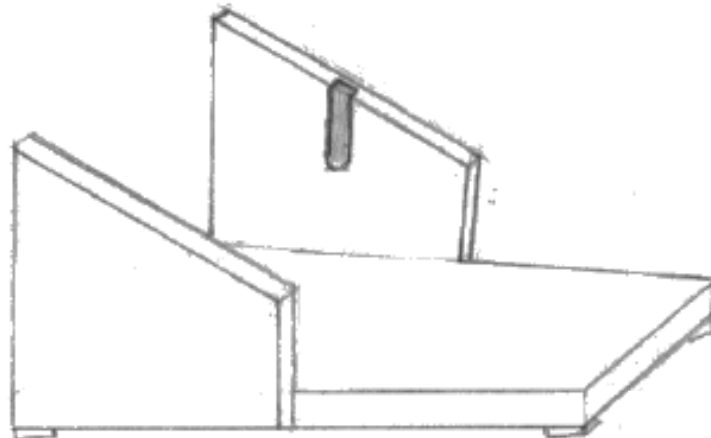


Extract 2a and 2b

Measurements along the side of the table so that tape can be cut accurately.

Modification 2 → A blade has been added ~~at~~ the end of the table for the tape to be cut easily without the need of scissors.

Extract 3



The format of the assessment evidence provided for Activity 3 was very similar in the most part, irrespective of the marks gained. Most learners provided:

- Sketches of ideas in isometric with some further drawn views, possibly as an explosion and/or as a side, front or plan elevation according to what the learner was trying to communicate
- Annotations (not labels) that explained the ideas, with those who gained higher marks providing comments that directly referenced the bullet points at the bottom of the Part B Client brief

This type of format allowed learners to provide evidence that showed they had addressed each of the strands in the Activity 3 marking grid. As Activity 3 is worth 9 marks from 60 marks available overall, learners should provide an overall response that includes some detail.

Activity 4 - Develop a modified product proposal with relevant design documentation

Activity 4 requires learners to develop a modified product proposal based on the Part B Client brief and their outcomes from Activities 2 and 3. There is guidance as to what is required for a fully developed proposal in the task booklet [The proposal must consist of a solution including a final drawing and must consider existing products, materials, manufacturing processes, sustainability, safety and other relevant factors], and each of these should be addressed in the response in order to gain higher marks. The assessment focus is 'Develop a modified product proposal (form, materials and/or manufacturing processes)' and the subtask is 'Solution'.

Learners should include a range of relevant design documentation to support their proposal. The said documentation is exemplified in section C2 of the Unit 3 specification. As with Activity 3, learners should use appropriate sketching and graphical techniques, along with technically accurate written content, to articulate fully their modified product proposal. The assessment focus is 'Develop a modified product proposal (form, materials and/or manufacturing processes)' and the subtask is 'Design Documentation'.

Again, the vast majority of learners attempted this activity and a wide range of responses were seen, resulting in a full range of marks across Bands 1 to 4.

In this series, the following characteristics were often evident in the response from learners that gained lower marks for this activity:

- The solution generated - a) was a fairly minor improvement on the original tape dispenser; b) showed some variation in form (rather than approach) when compared to the original tape dispenser design and may have included, for example, a quicker method for detaching/reattaching the dispenser plates to the dispenser table (a simple improvement); and c) was generally safer and slightly more effective than the original tape dispenser design.
- The annotation/notes/text - a) simply referred to existing products in a very generic sense, without providing any comments on how they were used when redesigning the tape dispenser; b) referred to/considered just

one non-optimal material for the chosen tape dispenser (such as stainless steel), but sensible reasons for its use were normally stated; c) referred to/considered just one or two manufacturing processes, but they were generally suitable and some sensible reasons for their use were stated; and d) did not consider sustainability in an explicit/contextual fashion.

- Technical terminology was reasonably accurate throughout and the drawings/annotation/written text/notes would have allowed a competent third party to understand the solution, due to an appropriate level of communication in the aforesaid; for example, sub-titles were evident and the drawings were reasonably straightforward to comprehend.

Conversely, the following characteristics were often evident in the response from learners that gained higher marks for this activity:

- The solution generated - a) was a clear improvement on the original tape dispenser; b) showed a clear variation in form/approach when compared to the original tape dispenser design, for example it may have removed the requirement for dispenser plates to be used and/or allowed both rolls of tape to be dispensed at the same time and/or used just one dispenser shaft for both rolls of tape and/or included tension rollers; and c) was safer than the original tape dispenser, for example by removing any potential need for the user to hold the tape dispenser with one hand while pulling the tape with the other hand.
- The annotation/notes/text - a) referred to existing products from research in a specific manner, and it was normally evident how the features of different existing tape dispensers/products were used in the chosen solution; b) referred to/considered different/optimal materials for the chosen solution (such as aluminium alloy) and gave suitable reasons for their selection; c) referred to/considered different/appropriate manufacturing processes (probably with reference to batch/mass production) and gave suitable reasons for their selection; and d) mentioned sustainability at several points (but this may have been a weaker aspect of the response). For the latter, there should be consideration of, for example, raw materials extraction, material production, production of parts, assembly, use and disposal/recycling in the context of the chosen solution.
- Accurate technical terminology was used throughout and the drawings/annotation/written text/notes would have allowed a competent

third party to attempt to manufacture the new solution, due to the aforesaid being 'effective'; for example, a suitably accurate orthographic projection was evident.

The following extracts show examples of some of the aforesaid characteristics (please refer to both parts of the Activity 4 marking grid):

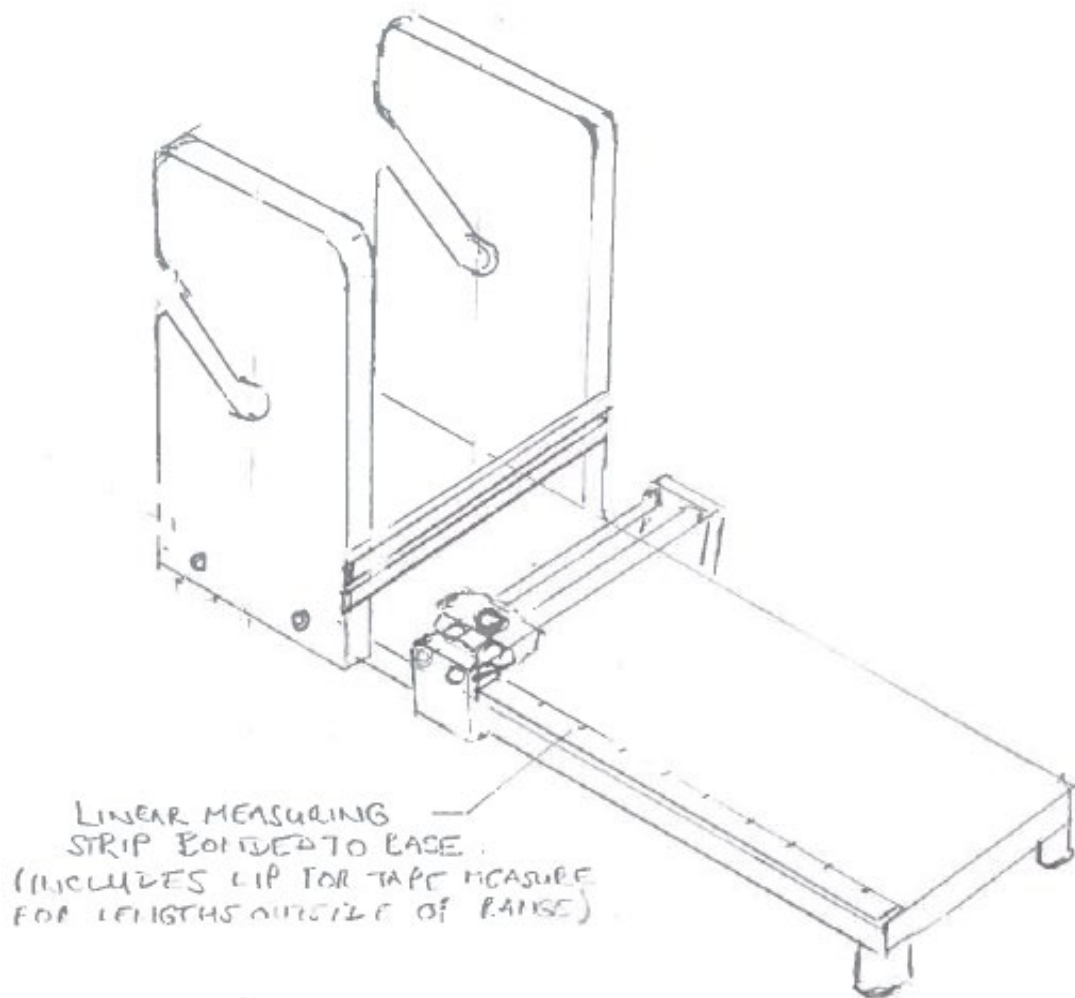
In Extract 1, the learner has provided a solution that is a major improvement over the original tape dispenser design. There is an annotation that references the measurement feature of the redesigned tape dispenser; this addresses an issue stated in the Part B Client brief. The idea has clearly 'designed out' most of the issues with the original tape dispenser. This type of response is representative of Band 4 evidence.

In Extract 2, the learner has provided a brief comment about a feature on an existing tape dispenser and why it is useful; however, this type of response is representative of Band 2 evidence only, as the text lacks specificity in relation to how the feature has been used in the redesign.

In Extract 3, the learner has chosen a manufacturing process (die casting) to make their solution and has provided an outline/generic description of the process; however, the text does not consider other options and lacks specific/contextual technical details that justify why the stated manufacturing process is suitable to make the redesigned tape dispenser. As a result, this type of response is representative of Band 1 evidence.

In Extracts 4a and 4b, the learners have provided effective drawings (with some detail) that, along with some further annotation/written text/notes, would allow a competent third party to interpret how to manufacture the solution. These types of response are representative of Band 4 evidence (for the 'Design Documentation' sub-task).

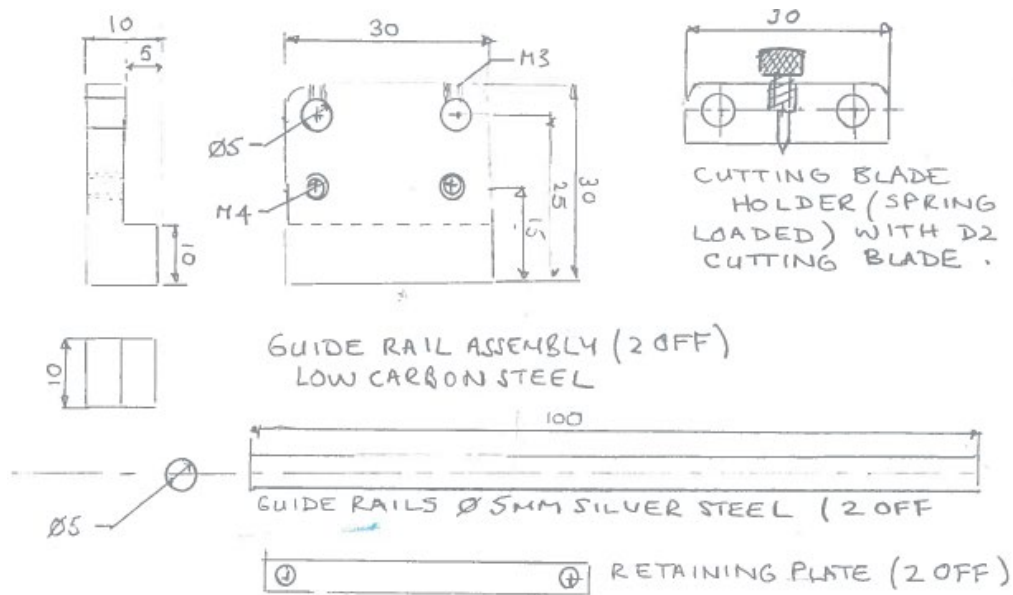
Extract 1



Extract 2

Many of the existing designs use L-shaped slots for ease of loading and unloading of tape.

Extract 3



The format of the assessment evidence provided for Activity 4 varied; nonetheless, the majority of learners that performed well on this activity:

- Provided a final design drawing of an optimised solution in isometric and via an orthographic projection
- Generated further drawings and detailed technical annotation (of all the drawings) as appropriate to ensure that the solution was communicated effectively and would allow a competent third party to interpret how to manufacture it
- Produced a series of relevant technical comments (with justification) under a series of sub-titles that related to their consideration/use of existing products, materials selection for different parts of the solution, manufacturing process selection for different parts of the solution and sustainability at all stages of the product life cycle

This type of format allowed learners to provide evidence that showed they had addressed each of the strands in the Activity 4 marking grid (both parts). As Activity 4 is worth 30 marks from 60 marks available overall, learners should spend more time on this activity than any of the others and must ensure that they address all of the bullet points stated in the task booklet in their response.

Activity 5 - Evaluate the design proposal

Activity 5 requires learners to evaluate their design proposal. Learners should reflect on their own solution (from Activity 4) in relation to the Part B Client brief and the original design (in this case, an aluminium foil tape dispenser) and provide a rationale for why their new solution is more effective. The evaluation needs to consider several factors: the success and limitations of the solution; the indirect benefits and opportunities of the solution; and any constraints related to the solution. The evaluation should also reflect on how technology-led modifications could optimise the solution suggested. The assessment focus is 'Validating the design proposal'.

Again, the vast majority of learners attempted this activity and a wide range of responses were seen, resulting in a full range of marks across Bands 1 to 3.

In this series, the following characteristics were often evident in the response from learners that gained lower marks for this activity:

- The appraisal focused, in an explicit fashion, on why the new tape dispenser design was a success but sometimes referred to simplistic/generic/non-specific considerations, such as price/'strength'. Opportunities/limitations/constraints/indirect benefits were normally not considered in detail, but some salient points were evident.
- The rationale gave some appropriate reasons as to why the new solution was considered more effective than the original tape dispenser design but it was self-congratulatory in places and only referenced the bullet points at the bottom of the Part B Client brief in an implicit fashion or to state they had been met.
- Comments on some further technology-led modifications were evident but they were very generic and/or irrelevant, for example, they referred to the use of additive manufacturing without stating why the application of the technology would be beneficial when manufacturing the new tape dispenser design.

Conversely, the following characteristics were often evident in the response from learners that gained higher marks for this activity:

- The appraisal focused, in an explicit fashion, on the successes, limitations/constraints and opportunities associated with the particular (new) tape dispenser design, for example 'The tape dispenser design includes right-angled slots for the dispenser shafts, a ruler, a serrated edge and a location bar so that it's easy to find the edge of the tape, which solves a lot of problems with the original design. It still isn't the best design though as that would be where either roll of tape could be dispensed with one hand to minimise the need for changeover and so that other items can be held at the same time as the tape being dispensed. This would mean that the tape dispenser would be much more operator friendly, but I couldn't think of a way to do either as the dispenser table couldn't be redesigned and it didn't say how it was fixed to the bench'.
- The rationale gave good reasons as to why the solution was effective and referenced some of the bullet points at the bottom of the Part B Client brief.
- Contextualised comments on some further technology-led modifications were evident and referred to, for example, optical sensors to measure distance or the use of safety interlocks to prevent injury if the tape cutting process was automated.

The following extracts show examples of some of the aforesaid characteristics (please refer to the Activity 5 marking grid):

In Extract 1, the learner has provided an appraisal of the successes of the chosen solution. The appraisal is particular to the solution itself, implicitly references two of the bullet points at the bottom of the Part B Client brief and gives valid reasons as to why the new features are effective. This type of response is representative of Band 3 evidence.

In Extract 2, the learner has provided a list of statements that refer to the perceived benefits of the new solution; however, the said comments generally just repeat (using different words) some of the text in the Part B Client brief. Specific examples as to why the new tape dispenser design meets the product requirements are not evident/lack justification. As a result, this type of response is representative of Band 1 evidence.

In Extract 3, the learner has suggested some possible technology-led modifications with some references to motorisation/automation/computer control and specific comments that describe how they could be used to optimise the solution. As a result, this type of response is representative of Band 3 evidence.

Extract 1

- By adding the cutter to my dispenser, I was able to massively reduce the time wasted on trying to cut the tape with scissors. This results in ~~less~~ more time being spent on the object/component the workers are completing.
- The bar across the bottom of the dispenser is successful as there will be no time wasted trying to find the end of the roll. This reduces the frustration of the workers and makes the dispenser more practical.
- The measurement a long the side of the table allowed users to cut their tape to scale massively reducing the amount of aluminium foil tape that was wasted.

Extract 2

The new design addresses these areas of the brief:

- IT'S REALLY DURABLE, IT WILL LAST FOR THE needed ~~range~~ cycle life cycle
- IT'S ~~RE~~ ROBUST AND STRONG
- THE CHANGE OF THE ^{shafts} TAPES ^{are} IS REALLY QUICK (ONE MOVEMENT)
- IT'S CAPABLE OF BEING MANUFACTURED IN BATCHES OF 100

Extract 3

Opportunities for future technology-led modifications may include; motorised dispensers/shafts which will automatically ~~re~~ unroll and dispense the tape, automated tape cutters which will cut the tape automatically when it reaches a desired length and Computer Coded measurements which will stop rolling the tape as soon as it reaches the length it is told.

The format of the assessment evidence provided for Activity 5 varied; nonetheless, the majority of learners that performed well on this activity provided a series of relevant comments (with justification) under a series of sub-titles that related to:

- The successes and limitations of their solution (with reference to the Part B Client brief and/or the issues and operational requirements highlighted in Activity 2)

- The indirect benefits and opportunities resulting from their chosen solution
- The constraints of their chosen solution
- Further technology-led modifications

This type of format allowed learners to provide evidence that showed they had addressed each of the strands in the Activity 5 marking grid. As Activity 5 is worth 9 marks from 60 marks available overall, learners should provide an overall response that includes some detail.

Summary

Based on the outcomes and performance of learners for this task, learners in subsequent series should:

Activity 1

- Link forward planning to the specifics of the product being redesigned, based on a consideration of what has happened in previous sessions (this must not be generic and should not simply reiterate the statements underneath the activity headings in the task booklet).
- Provide explanations/justifications for the specific changes made during each session in order to fulfill the requirements of the Part B Client brief.

Activity 2

- Use their conclusions from the interpretation of numerical data to suggest some justifiable product requirements.
- Generate a series of relevant, contextualised comments in bullet point form under a series of sub-titles related to product requirements, opportunities/constraints, health and safety and regulatory/sustainability factors, and ensure they are justified in relation to the issues and operational requirements identified from the Part B Client brief.

Activity 3

- Sketch three or four different and fit for purpose proposals in isometric that address all of the aspects in the Part B Client brief and provide further drawings/views dependent upon the idea being communicated.
- Use annotations (not labels) to explain the ideas, and refer to the five bullet points at the bottom of the Part B Client brief.

Activity 4

- Generate drawings and detailed technical annotations as appropriate to ensure that the most suitable solution is communicated effectively and would allow a competent third party to interpret how to manufacture it.
- Produce a series of relevant, contextualised technical comments (with justification) under a series of sub-titles that relate to the consideration/use of existing products, materials selection for different parts of the solution, manufacturing process selection for different parts of the solution and sustainability at all stages of the product life cycle.

Activity 5

- Provide a series of relevant, contextualised comments (with justification) under a series of sub-titles related to the successes and limitations of their solution (with reference to the Part B Client brief and/or the issues and operational requirements highlighted in Activity 2), the indirect benefits and opportunities resulting from their solution, the constraints of their solution and possible technology-led modifications.

The specifications for the 2016 Level 3 BTEC Nationals in Engineering (RQF) are available from:

[Specifications](#)

The Sample Assessment Materials (SAMs) for Unit 3 are available from:

[Sample Assessment Materials](#)

The tasks and Examiners' Reports for Unit 3 from previous series are available from:

[Tasks and Examiners' Reports](#)

Ofqual




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