Level 1 - Unit 2 - Product Manufacture (5 credits)

Relevant LINKS

BACK TO Smart Products UNITS **[1]**

Handbook home page **[2]**

Overview

Product Manufacture at Level 1 requires the candidate to understand how their product fits into the overall process of manufacture and know how it will be affected by different aspects of the process. They will appreciate what the best tools are for each stage and be relatively skilled in their use and deployment. They will display a good level of precision and finishing skills throughout. Finally, they will present their work and their findings from the process and act on any feedback received.

A work activity will typically be 'straightforward or routine' because:

The task or context will be familiar and involve few variable aspects. The techniques used will be familiar or commonly undertaken.

Example of context – Candidates will demonstrate a range of skills and practices in their product development.

Support for the assessment of this award [3]

Example of typical IT work at this level **[4]**

Assessor's guide to interpreting the criteria

General Information

QCF general description for Level 1 qualifications

- Achievement at QCF level 1 (EQF Level 2) reflects the ability to use relevant knowledge, skills and procedures to complete routine tasks. It includes responsibility for completing tasks and procedures subject to direction or guidance.
- Use knowledge of facts, procedures and ideas to complete well-defined, routine tasks. Be aware of information relevant to the area of study or work
- Complete well-defined routine tasks. Use relevant skills and procedures. Select and use relevant information. Identify whether actions have been effective.
- Take responsibility for completing tasks and procedures subject to direction or guidance as needed

Requirements

- Standards must be confirmed by a trained Silver Level Assessor or higher

- Assessors must at a minimum record assessment judgements as entries in the on-line mark book on the INGOTs.org certification site.

- Routine evidence of work used for judging assessment outcomes in the candidates' records of their day to day work will be available from their e-portfolios and on-line work. Assessors should ensure that relevant web pages are available to their account manager on request by supply of the URL.

- When the candidate provides evidence of matching all the criteria to the specification subject to the guidance below, the assessor can request the award using the link on the certification site. The Account Manager will request a random sample of evidence from candidates' work that verifies the assessor's judgement.

- When the Account Manager is satisfied that the evidence is sufficient to safely make an award, the candidate's success will be confirmed and the unit certificate will be printable from the web site.

- This unit should take an average level 1 learner 30 hours of work to complete.

Assessment Method

Assessors can score each of the criteria N, L, S or H. N indicates no evidence and it is the default setting. L indicates some capability but some help still required to meet the standard. S indicates that the candidate can match the criterion to its required specification in keeping with the overall level descriptor. H indicates performance that goes beyond the expected in at least some aspects. Candidates are required to achieve at least S on all the criteria to achieve the full unit award. Once the candidate has satisfied all the criteria by demonstrating practical competence in realistic contexts they achieve the unit certificate.

Expansion of the assessment criteria

1. Relate a product design to its manufacture

1.1 I can check quality in a design in preparation for manufacture.

Candidates should check their design for possible quality issues prior to manufacture.

Evidence: Documentation in portfolios, assessor observations

Additional information and guidance

The candidate should be guided systematically to check the design for any quality issues that will affect the manufacture. This could be related to precision, choice of materials, suitability for files used to automate manufacture, finish or any other attributes that need transfer from the design to manufacture.

1.2 I can use scale and dimensions to associate plans with manufacture.

Candidates should appreciate the link between scale and dimensions in their plans and how these translate to the manufacture of the product.

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Evidence: Documentation in portfolios, assessor observations

Additional information and guidance

The candidate should be able to work with simple scale multiples transferring dimensions from their plans to materials in order to manufacture the product.

1.3 I can prepare and document files to support the process of moving from design to manufacture.

Candidates should prepare any information needed for supporting the manufacturing process and organise it appropriately.

Evidence: Documentation in portfolios, assessor observations

Additional information and guidance

The candidate should be able to document the process of translating designs to products so that other people can follow the process. At Level 1 it is reasonable to provide direction and structure for the candidate and the process can be illustrated by photographs and diagrams.

1.4 I can make adjustments to a design as a result of feedback from the manufacturing process.

Candidates should be prepared to learn from experience and make adjustments accordingly.

Evidence: Documentation in portfolios, assessor observations

Additional information and guidance

The candidate should understand the concept of feedback as a positive mechanism for improvement. Finding out what works and what doesn't should be used usefully to inform the current and future design projects.

2. Use tools and information to support the manufacturing process.

2.1 I can select the tools needed for manufacture.

The candidate will find suitable tools to manufacture the product using the specification for the design.

Evidence: Documentation in portfolios, assessor observations

Additional information and guidance

Candidates should become familiar with a range of tools so that they can choose appropriately and based on rationale evidence. This implies significant opportunities for practice.

2.2 I can prepare information to manufacture a product.

The candidate will prepare the information to guide the manufacturing process.

Evidence: portfolio content and assessor observations.

Additional information and guidance

At Level 1 this will be a fairly straight forward product and candidates need to begin to appreciate

that to manufacture complex objects, good referral information is likely to make the task easier and more reliable. They need to prepare information ahead of manufacturing the product, such as creating and gathering a list of materials needed for manufacture. Candidates might attempt more than one project in order to provide a broader range of experience in preparing the information for manufacture. A lot will depend on complexity and issues arising along the way. At level 1 learners may be guided in the range of materials but they should have opportunity to prepare as much of the information necessary for their own project as possible in order to identify and appreciate the complexities.

2.3 I can use manufacturing tools with appropriate precision and attention to safety.

The candidate will use a range of appropriate tools to the appropriate precision under guidance.

Evidence: Photographs of products, portfolio content and assessor observations.

Additional information and guidance

The appropriate precision will depend on the particular tools and circumstances and in keeping with the Level 1 global criteria assessors should provide reasonable guidance and sufficient time for candidates to practice skills. Candidates should appreciate the meaning of the word precision and that nothing is absolutely precise. The degree of precision will depend on the needs of the task and the tools available. Safety should always be considered and acted upon. At Level 1 close supervision should be applied where there are any significant risks. Candidates should accept this gracefully and be guided through a risk assessment where this is relevant. They should be familiar with the concept of a risk assessment.

2.4 I can fabricate a product using appropriate materials and settings.

The candidate will end up with a product or prototype that is in keeping with the design brief.

Evidence: Series of photographs showing the steps in the manufacturing process in portfolio, assessor observations.

Additional information and guidance

Candidates will build their products and record the evidence photographically. The crucial learning is that which comes from physically manufacturing a design. At one level a student can evolve the design through identifying and eliminating errors between digital to physical modelling techniques, at a more advanced level students can use information from the physical modelling process to evolve the actual design. At Level 1 this will be a fairly straight forward product and candidates need to begin to appreciate that a high level of skill and knowledge is required to manufacture complex objects even using a CNC device. Candidates might attempt more than one project in order to provide a broader range of experience. A lot will depend on complexity and issues arising along the way.

2.5 I can finish or assemble parts and components.

Candidates can add finish and refinements to components, prototype or product.

Evidence: Photographs of the final finished digital prototype, assessor observations, work log in portfolio.

Additional information and guidance

Physical components may need to be post processed for example sanded, painted or fixed using appropriate hand tools, fixtures and fittings as necessary. Candidates should pay particular attention to small delicate components. Final assembly might need manipulation of components. Some of these finishing techniques are likely to require practice and candidates should be given sufficient time to develop these practical skills with due emphasis on safety.

2.6 I can identify and correct errors to make improvements to my work.

Candidates can make adjustments that improve their work.

Evidence: Photographs illustrating changes, assessor observations, work log in portfolio.

Additional information and guidance

Candidates should appreciate that while it is a good idea to eliminate as much risk and uncertainty before manufacture it is inevitable that adjustments might be needed. They should have enough opportunities either in making a range of components or other products/parts to be able to demonstrate evidence of improving their work as needs arise.

3. Present evaluations of manufacturing processes.

3.1 I can collect evidence for presenting the manufacturing process.

The candidate will prepare their presentation using the evidence gathered and collected in their portfolio.

Evidence: Portfolios, presentations, assessor observations.

Additional information and guidance

Candidates will gather the information they need to make their presentation. This will most likely be an on-going process throughout a project or projects. Level 1 candidates should be able to gather information but they will need help with structure and organisation. Use of digital photographs and video should be encouraged.

3.2 I can present strengths and weaknesses in the manufacturing process.

The candidate will identify a range of strengths and weaknesses in the manufacturing process.

Evidence: Portfolios, presentations, assessor observations.

Additional information and guidance

Candidates should be taught to be critical of their work and to classify strengths and weaknesses both from their perspective and through peer review and asking others. Particular attention should be given to any health and safety issues arising. At Level 1 structured support and guidance will be needed in keeping with the level descriptor.

3.3 I can use appropriate digital and/or physical drawings or models to support a presentation of the manufacturing process

Candidates should show a consistent standard of good use of the tools required for the job.

Evidence: Portfolios, presentations, assessor observations.

Additional information and guidance

Manufacture requires candidates to understand sequences and use of tools and this should be reflected in their presentation. Candidates should be aware that the first way to evaluate their final product is against the specification in the design brief taking account of any changes that have been made. Their digital and physical models should be used to demonstrate how manufacture builds on the design process and can feedback into it. If things have changed they should be able to say why. At Level 1 they will need support in providing structure and cohesion to their presentation. Being

able to do this with minimal support is a characteristic of Level 2.

3.4 I can receive feedback from presenting a manufacturing process.

Candidates should be given the opportunity to present their work to an audience who will be able to give constructive feedback.

Evidence: Portfolios, presentations, assessor observations.

Additional information and guidance

Candidates should receive feedback graciously from any source and should consider it objectively. At Level 1 this might need support and time for them to gain control over emotions and part of the purpose is to achieve a mature response to criticism even where it appears to be unjustified. This might take some repetition and practice in some cases and peer review can be used as a means of providing this efficiently.

3.5 I can act on feedback to improve a design.

Candidates should be able to act on the feedback given in order to improve their designs or the design process.

Evidence: Portfolios, presentations, assessor observations.

Additional information and guidance

Candidates should show evidence of acting on feedback even if it is in the end to do nothing because they have considered the evidence and make a judgement that any changes will be detrimental or inappropriate. In most cases some changes will be needed to a manufacturing process in hindsight and acting on this could be to record what to do if such circumstances arise again if it is at the end of the project and too later to make any direct changes to the product this time.

Moderation/verification

The assessor should keep a record of assessment judgements made for each candidate guided by the above guidance. Criteria should be interpreted in the context of the general descriptors of QCF Level 1 qualifications. They should make notes of any significant issues for any candidate and be in a position to advise candidates on suitable routes for progression. They must be prepared to enter into dialogue with their Account Manager and provide their assessment records to the Account Manager through the on-line mark book. They should be prepared to provide evidence as a basis for their judgements through reference to candidate e-portfolios. Before authorising certification, the Account Manager must be satisfied that the assessors judgements are sound. In the event of missing evidence, the assessor will be requested to gather appropriate information before the award can be made.

Links
[1] https://theingots.org/community/SMART_qualification_info_units
[2] https://theingots.org/community/sites/default/files/uploads/common/Handbooks/Smart_Tech/Smart%20Product%20Design_Spec_L1_L2_Spec_BCA_TLM_v3.3.pdf
[3] http://www.theingots.org/community/ITQcourse1
[4] https://theingots.org/community/sites/default/files/uploads/user4/pupila.pdf