

Moderators' Report/  
Principal Moderator Feedback

Summer 2014

Pearson Edexcel GCSE in Manufacturing

5MN02 Paper 01

Manufactured Products

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## **Unit 5MN02 Manufactured Products**

### **General Comments**

The performance of centres in this examination was similar to that in the previous series.

Those centres whose students tended to achieve the higher mark ranges were characterised by;

- Selecting a product to be manufactured that had an appropriate degree of demand for their students.
- Providing their students with clear and detailed manufacturing specifications and production plans.
- Allocating an appropriate amount of time for all of the assessment criteria to be addressed by their students.
- Supporting their students' achievements with detailed and comprehensive observation records and/or photographic records.

In contrast to the above, in some instances the following situations were observed.

- Students being provided with design specifications that lacked appropriate quality indicators, such as tolerances.
- Students being provided with production plans that lacked the appropriate depth of information.
- Centre assessors awarding marks to ephemeral factors, such as contribution to teamwork, without supplying evidence to support the marks awarded.

Quality of Written Communications (QWC) is assessed in one of the eight criteria but was rarely referred to specifically by centre assessors. Assessment of QWC considers students' abilities to:

1. Write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear.
2. Select and use a form and style of writing appropriate to purpose and complex subject matter.
3. Organise relevant information clearly and coherently, using specialist vocabulary when appropriate.

The maximum score for unit 5MN02 is 50, and this unit also carries 30% of the overall assessment weighting for the double award GCSE Manufacturing.

### **Administration**

Centres submitted the required portfolios before the deadline. Portfolios were received in a variety of shapes and sizes, but the preferred method for submitting any written work is to provide word processed work on A4 paper, in portrait mode, and hold each student's portfolio together using a single treasury tag through the top left hand corner only.

Most centres made good use of photography to support their assessment decisions of student work.

## Centre Assessment

Where witness testimonies were used, the most effective ones tended to say exactly what was observed. Detailed and informative witness comments, when combined with the content of the students work, help the moderator follow and understand why a centre has awarded particular marks. This in turn helps the moderator agree with the marks awarded by the assessor/ teacher.

Many of the criteria in this unit require assessor judgements, with supporting evidence, about the level of independence or support which was witnessed. The most effective centres provided a summary of assessment considerations within each portfolio inserted in front of each criterion.

**Criterion a)** - working as part of an effective team.

In order to complete this criterion students need to address two components;

- Evidence of the contribution they made to their team's outcomes
- Records indicating the extent to which both team and personal targets were achieved

As previously commented witness statements are essential for the first component of the assessment criterion, in which the assessor must record what each individual did within the team – whether they played a leading role, whether they helped to build an effective team, or whether they just contributed to an effective team. For each of these judgements details must be provided about how these were achieved.

A common format, that successfully provided some of the evidence for the second component, were minutes of team meetings. In order for these to be useful they need to contain specific targets for the team and individuals to achieve. The use of regular meetings allows students to clearly record how far towards their targets they had progressed. The minutes also showed where problems with the intended plans arose and how they were adapted to overcome them.

Centres should note that where a single student takes notes about agreed targets and achievements etc. this evidence should not then be credited to all members of the team. Either each student should take responsibility for maintaining their own records of their personal performance, and/or each student should record a different, identifiable, aspect of the team performance.

**Criterion b)** - produce a schedule for manufacture

In order to complete this criterion students need to address two components;

- Details of how their individually assigned parts of the product will be manufactured

- A schedule for the manufacturing tasks being undertaken by their team

The first component of this criterion was most successfully addressed when students produced plans for production that included all preparation and assembly stages, health and safety, PPE, production and quality control procedures and consideration of how the product can be made most effectively. This should be based on the information provided by the centre at the outset of the assignment.

The second component of the criterion was successfully addressed using combinations of Gantt and flow charts. Gantt charts proved to be an effective method of displaying sequence and timing considerations. Flow charts were used to greatest effect when they were linked to quality control purposes.

It is important that individual contributions to the production of team documents can be traced by the moderator. A useful approach might be for students to first produce their own versions of a Gantt and/or flow chart. This could then be combined and refined by the complete team to produce a single improved version. This method would help clarify specific contributions each member of the team makes.

The materials produced for this criterion should become working documents for the students. By annotating the work with details of problems, or differences in times, as they occur, the foundations for criterion h) -modify production plan and schedule - will be formed. For example the addition of a blank row below each stage in a Gantt chart would allow actual times to be recorded with minimal effort being expended by the students.

### **Criterion c) - prepare and use materials**

In order to complete this criterion students need to address two components;

- Evidence relating to the amount of support they required in order to prepare the materials and components needed to manufacture their products.
- Evidence of the working safely and applying skills.

Again, witness statements are essential, to record the level of guidance provided as each student prepared relevant materials and components and the skill level with which they used tools, safely.

Annotated photographs of the manufactured product were an effective method for students to demonstrate how they had worked skilfully. The evidence may be implicit but a high quality final product would probably be dependent on the people making it skilfully. It is important that where students complete individual elements of the manufacture the photographs clearly allow the moderator to see what they did. In this way the performance of the whole team for this criterion is not determined by the least skilful individual member of the team.

**Criterion d)** - prepare and use tools, equipment and machinery

In order to complete this criterion students need to address two components;

- Evidence relating to the amount of support they required in order to prepare the tools, materials and components needed to manufacture their products.
- Evidence of them working safely and applying skills while using processes and following procedures.

The comments made for criterion c) apply in the same way to criterion d).

**Criterion e)** - manufacture products to meet requirements

In order to complete this criterion students need to address two components;

- Evidence of the safe manufacture of products to meet the client's requirements.
- Evidence of the product conforming to quality standards.

To a large extent a student's ability to gain credit for the second part of the criterion depends on the level of detail they are provided with in the client brief. If the client's requirements and quality standards are not clearly defined then a student will not be able to address them.

In order to gain marks from the higher ranges there is an expectation that several kinds of evidence will be provided. A witness statement should be used to confirm that products were made to the appropriate standard. This should be supported with evidence of the student themselves checking the quality of the outcomes, typically annotated photographs were successfully used to provide this.

**Criterion f)** - monitor production

In order to complete this criterion students need to address two components;

- Evidence of the comparisons between the expected time to manufacture the product and the actual times taken.
- Comments that consider why there were differences between the two sets of times.

This criterion appeared to be poorly understood by a number of centres. It was interpreted as being related to quality control, which is section 'g' rather than about monitoring the rate of production and timing of each element/activity.

Those centres whose students accessed the higher mark ranges were characterised by including space to record actual timings within the materials produced for criterion b). These actual timings were collected during the manufacturing processes.

Centres, and hence their students, should be aware that it is highly likely that the original plans with their estimated times will not be accurate. There is no penalty for finding something wrong within the original planning, but there are marks to be gained for detecting it and suggesting and making improvements 'in order to maintain production'.

**Criterion g) - use quality control techniques**

In order to complete this criterion students need to address two components;

- Evidence of the student objectively monitoring the quality of the artefacts produced.
- Evidence of consideration of possible reasons, and potential solutions, for artefacts failing to conform with to the required standard.

Students should be encouraged to record specific details of the results of quality control tests, not simply if the item being considered passed or failed. For example two versions of quality control test records are shown below for a component with required length of 25mm +/- 0.5mm. The version on the right hand side conveys more useful information than the one on the left.

Component	Length 25 +/- .5
1	Pass
2	Pass
3	Pass
4	Fail

Component	Length 25 +/- .5	Decision
1	25.1	Pass
2	25.3	Pass
3	25.5	Pass
4	25.7	Fail

The results of the testing should also be accompanied by photographic evidence of the tests being performed.

**Criterion h) - modify production plan and schedule for manufacture**

In order to complete this criterion students need to address two components;

- Using data collected during the manufacturing process to improve the production plan
- Using data collected during the manufacturing process to improve schedule for manufacture.

To a large extent a student's performance in this criterion is closely linked to those that have preceded it. Typically it was observed that students performing in lower mark ranges for the early criteria were subsequently unable to access the higher mark ranges for this criterion.

The importance of the information students are given at the start of this assignment must be given due consideration by centres. Where students are not provided with an appropriate level of detail in the client brief and

specification, access to the higher mark ranges, in multiple criteria, will not be possible for even the most able of student. When structuring assignments for students, centres might consider working from the end of the assessment criteria towards the beginning. That way they could consider "if my students need to show they can do this here I need to give them this information here".

## **Grade Boundaries**

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

