

1145-21 Level 2 Certificate in Engineering (Manufacturing Technologies)

2022

Qualification Report

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Introduction

This document has been prepared by the Chief Examiner and Principal Moderator; it is designed to be used as a feedback tool for centres in order to enhance teaching and preparation for assessment. It is advised that this document is referred to when planning delivery and when preparing candidates for City & Guilds Technical assessments.

This report provides general commentary on candidate performance in both the synoptic assignment and theory exam. It highlights common themes in relation to the technical aspects explored within the assessment, giving areas of strengths and weakness demonstrated by the cohort of candidates who sat assessments in the 2022 academic year. It will explain aspects which caused difficulty and potentially why the difficulties arose.

The document provides commentary on the following assessments:

- 1145-520 - Level 2 Technical Certificate in Engineering (360) - Theory exam
 - March 2022 (Spring)
 - June 2022 (Summer)
- 1145-027 - Level 2 Technical Certificate in Engineering (Manufacturing Technologies) – Synoptic Assignment

Foreword

Results August 2022

As you will likely be aware, Ofqual has announced that grading for General Qualifications this summer will be more generous than prior to the pandemic. This is partly due to managing the impact of disruption and learning loss on learner performance and also managing fairness between learners in different years who had different methods of determining their grades. Therefore, for A levels and GCSEs, grading will seek a midway position between 2019 and 2021, meaning, in general, results will be somewhat higher than prior to the pandemic. This year, 2022, is a transitional year and outcomes and standards will likely return to pre-pandemic levels in 2023.

Similarly, for Vocational and Technical Qualifications (VTQs), this summer will be a transitional year and Ofqual has now been clear that for VTQs “we should expect that this summer’s results will look different, despite exams and assessments taking a big step towards normality.” Ofqual has published a blog [What’s behind this summer’s VTQ results](#)

In acknowledgement of the disruption to learning and to support fairness for all learners certificating this summer (some of whom will be competing against learners taking General Qualifications for the same progression and higher education opportunities), we will be taking loss of learning into consideration, whilst still acknowledging the need to uphold the validity of the qualifications. On this basis, we have made the decision to apply a form of ‘safety net’ through some additional ‘generosity’ to both the theory examinations and synoptic assignments within our Technical Qualifications wherever appropriate, (noting that it may not be appropriate to apply where there is a clear impact on knowledge and skills to practice, particularly health and safety requirements or other relevant legislation). We are therefore also reviewing candidate work a few marks below (equivalent to 5% of maximum marks) the Pass and Distinction notional boundaries – the boundaries used during the awarding process as the best representation of maintaining the performance standard from 2019.

The reason for lowering boundaries, where appropriate, by 5% of the maximum marks available, is that it is broadly commensurate with the level of generosity learners are likely to see in General Qualifications at level 2 and level 3. Providing that senior examiners can support the quality of learners’ work seen below the notional boundaries and agree it is sufficient to maintain the integrity, meaning and credibility of the qualifications, the grade boundaries will be lowered across the full set of grades – e.g. Pass, Merit, Distinction and Distinction Star.

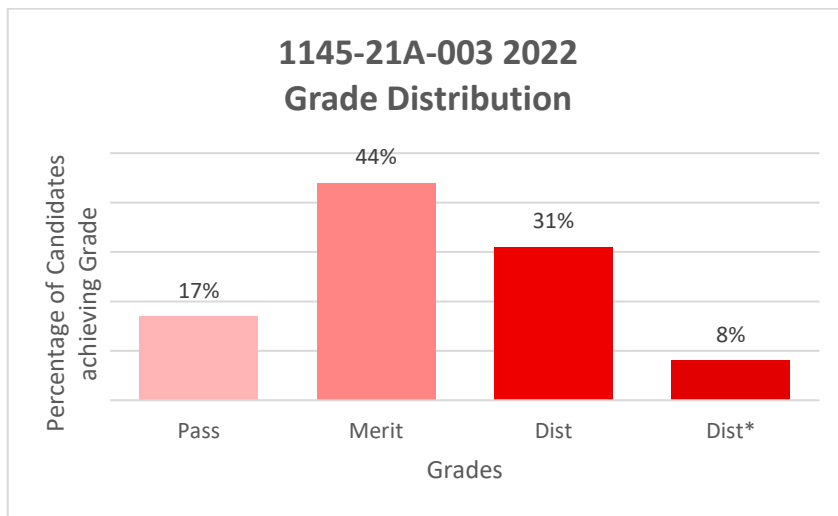
Given the circumstances, this is the best approach to take into account the disruption to teaching and learning across every learner in a fair and transparent way, and at the same time maintain the integrity and meaning of qualifications. This approach helps to level our Technical Qualifications awarding approach with that adopted for General Qualifications and other qualifications awarded in England and in the wider UK.

Spring examination series 2022

Having taken this decision, we are also mindful of learners who have taken components in **Spring 2022** and believe they should also have access to the same level of generosity. For these learners, we wish to adopt a similar approach. Therefore, for learners taking Technical Qualification assessments in spring there will be similar generosity, through the addition of 5% of the maximum mark available for the assessment. It is a different mechanism to that we are using for the summer assessments but provides the same level of generosity to those learners taking assessments in the summer.

Qualification Grade Distribution

The approximate grade distribution for this qualification is shown below:



This data is based on the distribution as of 26th August 2022.

Please note City & Guilds will only report qualification grades for candidates who have achieved all of the required assessment components, including Employer Involvement, optional units and any other centre assessed components as indicated within the Qualification Handbook. The grade distribution shown above could include performance from previous years.

Theory Exam

Grade Boundaries

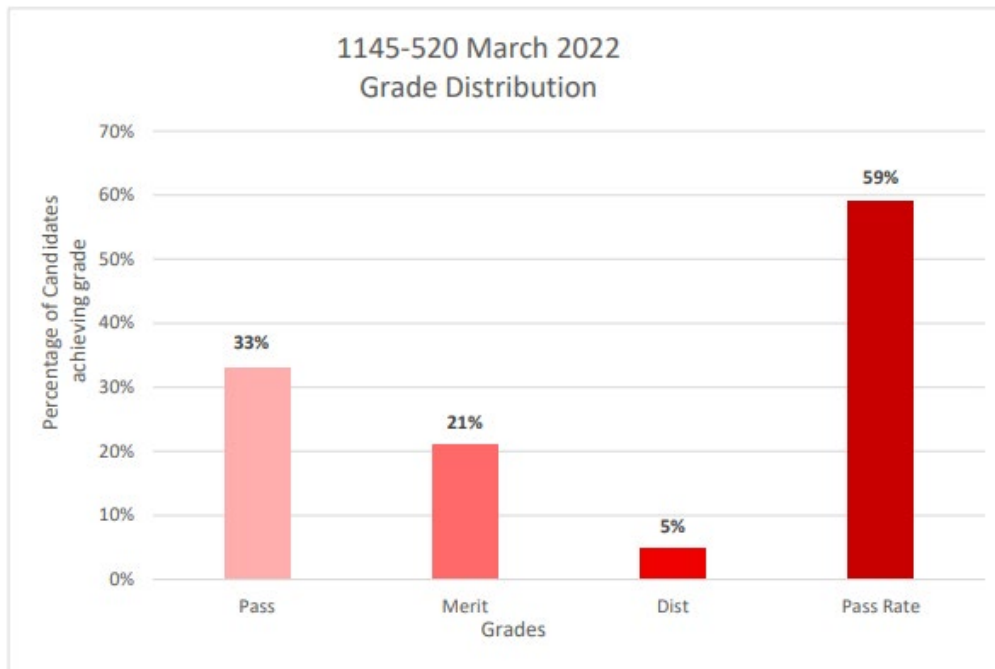
Assessment: **1145-520 Level 2 Engineering – Theory exam**
Series: **March 2022**

Below identifies the final grade boundaries for this assessment, as agreed by the awarding panel:

Total marks available	60
Pass mark	22
Merit mark	31
Distinction mark	41

The generosity applied to the summer assessments will also retrospectively be applied to candidates who achieved their best result in spring. 5% of the base mark of the assessment will be added to their score rather than applied to boundaries.

The graph below shows the approximate distributions of grades and pass rate for this assessment, it does not account for any marks that have been amended due to generosity:

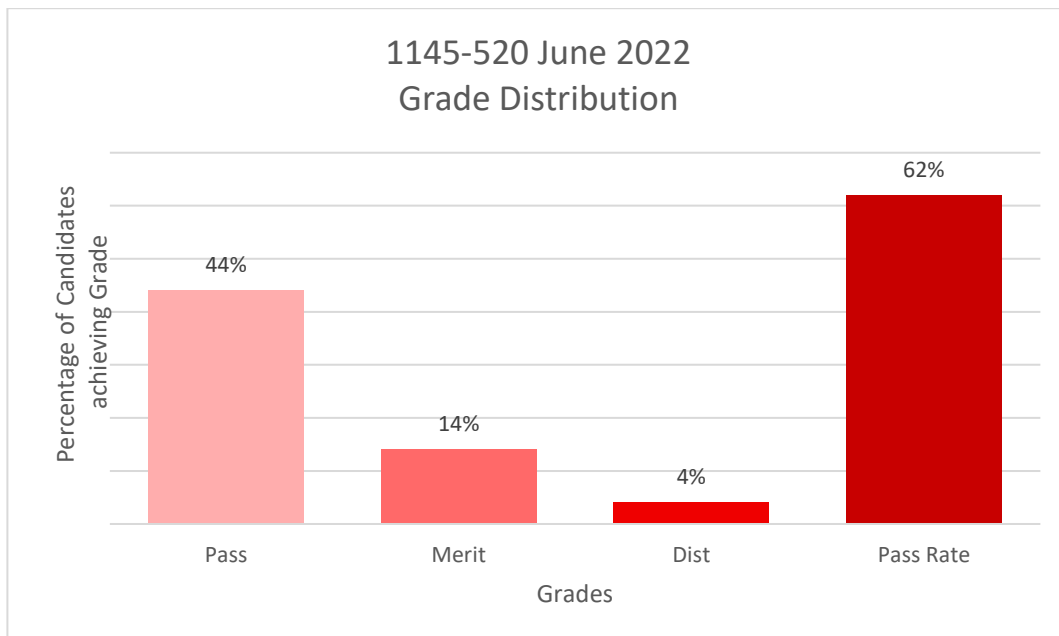


Assessment: **1145-520 Level 2 Engineering – Theory exam**
Series: **June 2022**

Below identifies the final grade boundaries for this assessment.

Total marks available	60
Pass mark	19
Merit mark	28
Distinction mark	38

The graph below shows the approximate distributions of grades and pass rate for this assessment using the above boundary marks:



Chief Examiner Commentary

Assessment component: 1145-520 Level 2 Engineering – Theory exam

Series 1 – March 2022

The paper met the requirements of the specification and were pitched appropriately for this level. The paper was comparable with previous series in terms of questions assessing knowledge recall, understanding and extended responses.

This examination was generally not answered well by candidates. There were a number of clear gaps in knowledge and understanding, leading to weak responses across several items within the paper. Examples of this include questions related to:

- mechanical systems and devices (mechanical symbols, gear ratios and levers),
- just-in-time manufacture and
- electronics (the de-soldering process).

Most candidates answered the gear ratio question, by performing the calculation in reverse, showing an area of common misunderstanding throughout the cohort.

The question relating to selecting materials and manufacturing processes, was generally very well answered and centres had clearly prepared candidates well for this type of question.

There was a mixed response to knowledge recall (AO1) questions, with some answered very well, such as questions on identifying electrical symbols and others very poorly answered, such as questions requiring candidates to state the definition of latent heat, give a description of a class three lever and the definition of Ohm's law. Responses given by the cohort showed little to no knowledge of topic areas.

A question on the type of engineering materials, focusing on ferrous and non-ferrous metal, was generally poorly answered. Just under half of the cohort answered by saying ferrous metals were magnetic and non-ferrous were not magnetic, which is incorrect, as some non-ferrous metals do demonstrate magnetic properties, and some ferrous metals do not e.g. certain grades of stainless steel.

In many instances candidates were able to give one or two basic points in response to questions requiring further understanding, but these responses often lacked the depth of knowledge and understanding needed to achieve the higher marks.

The extended response question 12 (ERQ) produced a good spread of responses and acted as the main differentiator for the paper. The majority of candidates achieved marks in the middle band, producing mainly descriptive responses but with some additional discussion and explanation shown. Most candidates would have benefitted from considering additional points in greater depth

Series 2 – June 2022

The paper met the requirements of the specification and was pitched appropriately for level 2. The paper was comparable with the previous March series in terms of questions assessing basic knowledge recall, deeper understanding and extended synoptic responses.

There was a mixed response to some questions, but this examination was generally not answered well by candidates. There were a number of clear gaps in knowledge and understanding, leading to weak responses across several questions within the paper.

In questions assessing knowledge, candidates often struggled to recall basic technical facts, such as the meaning of symbols on technical drawings. Candidates were able to identify a mechanical symbol better than the Geometric Dimensioning and Tolerancing (GDT) symbols assessed. A number of candidates did not attempt these questions and where candidates did respond, they gave answers as electrical components.

Questions assessing the definition of scientific terms were poorly answered. A large proportion of candidates answered the question on efficiency incorrectly with some confusing the term with speed and quantity of output. Again, a large proportion of candidates also answered the question on the definition of Watt's law incorrectly which was assessing basic knowledge recall. Some candidates referred to Ohm's Law, which was assessed within the March series, instead of Watt's Law.

Another area of weakness was in the application of basic tools, such as tin snips and crimpers with only a small proportion of candidates answering parts of this question correctly.

Candidates did perform better in questions assessing knowledge of technical manuals and types of shareholders in an engineering business.

In questions assessing understanding, candidates were often able to make some valid points related to the topics being assessed, but these often lacked the depth of explanation required to be able to access the higher marks. For example, questions on expectations of industry regulators and continuous improvement showed candidates picking up 1 or 2 marks by making basic points of knowledge recall, but very few answers demonstrated a depth of understanding to gain the higher marks available.

Maths-based questions were generally not answered well, with both the questions on the application of Pythagoras' theorem and the calculation of the volume of a sphere being particularly poorly answered. This was often because many candidates failed to show their working or, where appropriate, the methods (correct formulae) being used. It is recommended that candidates are encouraged to read the information given on the front page of the paper carefully, as this clearly states that all working must be shown within the question paper.

The synoptic question related to assessing knowledge of materials and manufacturing processes, was generally well answered although some candidates provided inappropriate materials for the question context, such as iron. The phrasing of this question is consistent across series with only the topic of focus changing. Candidates are often well prepared to answer this type of question given its consistent approach. However, some candidates picked a material and provided lengthy justification which did not cover the manufacturing context.

The extended response question generally acted as a good differentiator, with a broad range of responses given, albeit this was seen more in the low-mid range bands with only a small proportion of candidates reaching the upper band. A number of candidates wrote about standards used within businesses in general, rather than specific engineering standards, which limited the band of marks they could reach. Most candidates would have benefitted from showing greater depth and breadth of understanding in their responses.

Synoptic Assignment

Grade Boundaries

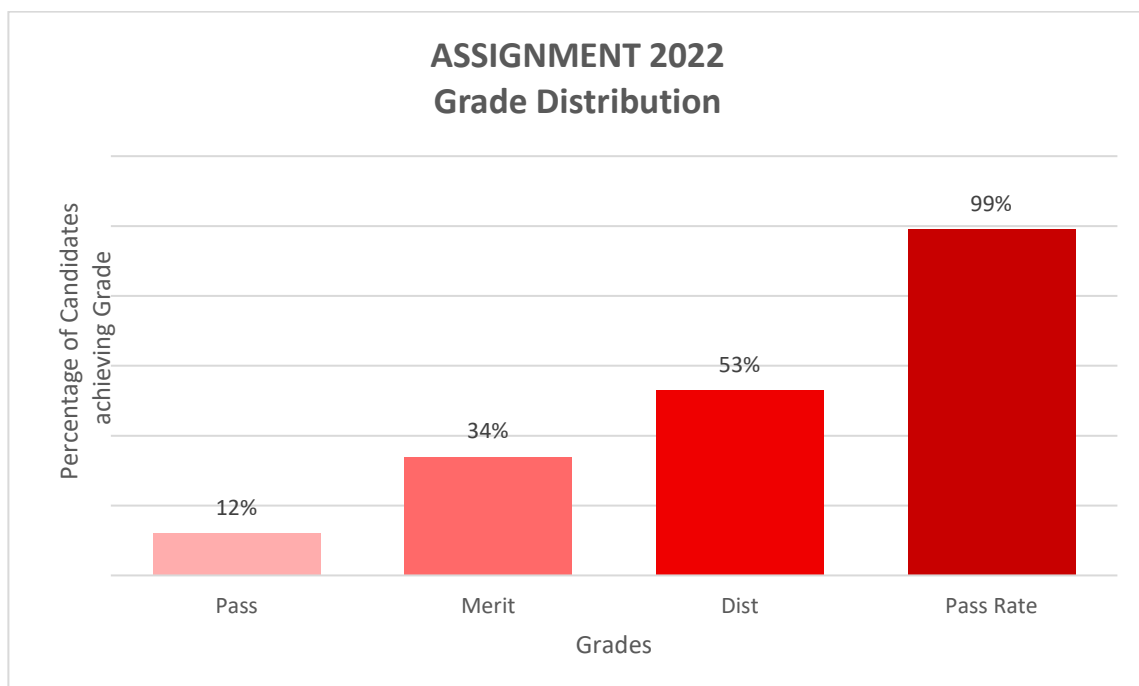
Assessment: 1145-027

Series: 2022

Below identifies the final grade boundaries for this assessment:

Total marks available	60
Pass mark	20
Merit mark	29
Distinction mark	39

The graph below shows the approximate distributions of grades and pass rate for this assessment using the above boundary marks:



Principal Moderator Commentary

Assessment component: 1145-027 Level 2 Engineering – Synoptic assignment

The assignment was similar to the previous series in structure, evidence requirements and difficulty of task. It was pitched appropriately for this level.

The assignment involved the manufacture of a clamp using manual and computer-controlled machines. This was carried out as a series of structured tasks.

Centres should note the minimum evidence required for each of the tasks is listed within the assignment and can be found under the headings *What you must produce for marking* and *Additional evidence of your performance that must be captured for marking*. The centre should direct all candidates to complete each task and to produce **all** the evidence listed. When work is submitted to City & Guilds, for moderation or additional evidence is requested, the centre should submit **all** work completed by the candidate in conjunction with all the synoptic assignment recording forms.

In general, this assignment was completed very well by candidates.

AO1 (recall of knowledge) was generally well evidenced, with output such as the bill of materials, production plans, risk assessments and evaluations of the manufacturing process, all using appropriate technical terms. Most candidates demonstrated excellent knowledge recall, using the correct terminology for the tools and processes required.

AO2 (understanding) was generally well evidenced, particularly where candidates gave justifications for any working practices undertaken and associated safety requirements. The evidence provided by most candidates included risk assessments and production plans that implicitly demonstrated the practical application of understanding. Some candidates went on to give reasons for the processes selected, demonstrating best practice. There were some cases where candidates missed the opportunity to provide supporting evidence for understanding by not fully annotating and explaining their programmes for the CNC machining activities, which, if provided, would have indicated a clear understanding of the sequence of activities being carried out.

AO3 (practical skill) was typically appropriately evidenced. Most centres included pictures of the manufacturing processes in progress, with supporting relevant commentary on the practical observation form. The best practice observed during the moderation process included pictures of the individual components, annotated with details of the manufacturing processes used.

AO4 (bringing it all together) was typically well evidenced, particularly in the production planning, justification of the processes used and the evaluation of components.

AO5 (attending to detail) was typically appropriately evidenced. There were some good examples of testing dimensional accuracy. In some cases, this could have been improved by providing additional supporting evidence in the form of test record sheets recording the main dimensions. This could also have been further supported with the inclusion of subjective comments from the tutor assessor documented on the practical observation form.

Overall, it was clear that markers had considered awarding marks across the full range of AOs in all tasks which is to be commended. It would assist moderation if centres could make or add comments to illustrate where assessment criteria were being specifically addressed.