



**T Level Design and
Development for Engineering
and Manufacturing Occupational
Specialism**

**8714-321 Mechanical
Occupational Specialism Report
(Summer 2025)**

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Foreword

Summer 2025 Results

The occupational specialism qualification is made up of one component, which need to be successfully achieved to attain the T Level Design and Development for Engineering and Manufacturing – Mechanical Occupational Specialism.

We discussed the approach to standard setting/maintaining with Ofqual and the other awarding organisations before awarding this year. As in 2024, we have agreed to take account of the newness of T Level qualifications in how we award, to recognise that students and teachers are less familiar with the assessments in the first years of awards, whilst also recognising the standards required for these qualifications

(<https://www.gov.uk/government/publications/ofqual-guide-for-schools-and-colleges-2025/ofqual-guide-for-schools-and-colleges-2025#grading>).

Introduction

This document has been prepared to be used as a feedback tool for providers in order to support and enhance teaching and preparation for assessment. It is advised that this document is referred to when planning delivery and when preparing candidates for the T Level Technical Qualification (TQ) in Design and Development for Engineering and Manufacturing – Mechanical **Occupational Specialisms**.

This report provides general commentary on candidate performance in the occupational specialism assignment. 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 summer 2025 assessment series.

The grade boundaries that were used to determine candidates' final summer 2025 results are also provided. **For summer 2025, as per Ofqual guidance, the approach to grading recognises that these are new qualifications.**

8714-321– Mechanical Occupational Specialism

Task 1 Design

Candidates are required to produce a detailed design specification that builds on the design criteria for the device in the assignment brief. Candidates then sketch and annotate drawings of potential designs, select an appropriate design and virtually model this utilising Computer Aided design (CAD) software. Candidates must justify their final design choice with supporting calculations, material and component selections and a Bill of Materials (BoM) for the proposed design.

Many candidates demonstrated excellent understanding and skill in creating drawings and diagrams. Higher performing candidates submitted high-quality engineering diagrams, such as detailed orthographic drawings with dimensions and annotations. Some candidates also successfully produced assembly and general arrangement drawings to clearly communicate their designs. However, a common shortfall was the omission of tolerances and a failure to use title blocks according to industry standards.

Most candidates demonstrated good virtual modelling ability in conveying assembly and sub-assembly drawings. Higher performing candidates also incorporated stress analysis and design simulations. While some candidates could calculate load on components and mechanical advantage, higher performing candidates excelled by providing detailed 'working out' and clear methods for presenting their calculation results. In contrast, lower performing candidates often lacked design matrices or supporting calculations for their designs.

Actions providers can take to support assessment preparation for future series:

- ensuring that all candidates consistently include tolerances and utilise title blocks to industry standard in their drawings. This suggests a need for more rigorous training or emphasis on professional drafting conventions and attention to detail.
- while some candidates could perform basic calculations (load, mechanical advantage), there is a significant gap to lower performing candidates in providing detailed 'working out', efficiency ratings, design matrices or comprehensive calculations to support their designs. This indicates a need to improve documenting calculations thoroughly and the application of quantitative methods to validate design decisions.

Task 2 Manufacture and test

Candidates are required to produce a risk assessment for the manufacturing and testing of their prototype, manufacture the prototype and test the operation of their prototype against the design criteria.

Risk assessments included consideration of the range of tools and equipment used with candidates focusing on a safe working environment, preventative measures to control risks and control measures to ensure safety throughout manufacturing. Lower performing candidates did not demonstrate understanding of the associated risk ratings and were not able to demonstrate control measures or incorporate responses to suggest risks associated with tools and equipment. They focused on generic safety of their work area and did not identify risks towards the safety of the user and others. Higher performing candidates developed comprehensive risk assessments, considering the likelihood and severity for all risks and hazards, with risk mitigation methods used in identifying all potential risks.

Higher performing candidates researched material properties in Task 1, incorporating metals, polymers and timbers for their 'real design concept', and opted for similar materials to produce their prototype models. Lower performing candidates researched materials in Task 1, and identified some material properties, yet developed their prototype models using MDF and adhesives, often resulting in a prototype that was not fit for purpose and could not be tested fully against the design criteria.

Higher performing candidates created high quality prototypes with various materials and different wheels, pulleys and mechanical components to enhance the functionality of their prototypes. Some candidates produced free standing models using counterweights to help support and balance their prototype models when lifting and lowering the desired weight successfully with high quality outcomes.

Higher performing candidates were able to demonstrate lifting the required weight with a steel rule and marking out the test area to highlight the required angles of rotation. The lower performing candidates attempted to test their prototype models against some, but not all, of the design criteria with varying success.

Actions providers can take to support assessment preparation for future series:

- candidates should specifically identify and detail control measures and proposed responses for risks including those relating to tools and equipment
- all candidates should consider the likelihood and severity of all risks and hazards, along with clear risk mitigation methods
- candidates should select and use prototype materials that are appropriate for the design brief and allow for the full realisation of the design concept and thorough

testing in line with the requirements of the brief. This may involve incorporating a wider variety of materials and different types of linkages (eg those allowing for specific movements, such as along a straight beam and pulley) to accurately represent and test their designs.

Task 3 Peer review

Candidates are required to present designs to their peers verbally using annotated sketches and diagrams to explain their design. They are then required to collaborate with peers to inform their own design and review their peers' designs, providing feedback.

Candidates excelled in the peer review process, collaborating effectively and using feedback to refine their designs, ensuring they met their goals. Many also skilfully integrated detailed amendments and suggested improvements into their revision control documents in future tasks, leading to enhanced design proposals in their virtual models.

The candidates are not awarded marks for this task; it provides supplementary evidence to support their final design choices, which they present in Task 4.

Actions providers can take to support assessment preparation for future series:

- maintain the high standards already demonstrated. For future assessments, the focus should be on ensuring all candidates consistently meet these excellent benchmarks.

Task 4 Evaluation and implementation

Candidates are required to produce a virtual model of their final design taking into consideration changes from peer review, manufacturing or testing. Candidates are then required to produce a revision control document or report justifying why changes were or were not required and provide a report evaluating the final design.

The higher performing candidates provided detailed revision control documents, incorporating modifications to their design proposals and prototype models following peer feedback and clarifying why changes were or were not made with detailed justifications.

Candidates were able to support their decisions with modified screenshots of their virtual modelling with sub-assemblies to demonstrate the impact the changes would provide to their design proposals. Many candidates were able to explain and justify how their modifications would support and enhance the functionality of their design proposals to meet more of the requirements of the design brief and design specification.

Some candidates supported their decisions with calculations following analysis of operating efficiency after testing the function of their prototype. They supported this with recording of test results against the design criteria, as well as visual and function tests, and with

assessment of specific mechanical features for future improvement. Lower performing candidates provided generic evaluations to their findings and inaccurate test results against the design criteria.

Actions providers can take to support assessment preparation for future series:

- ensure all candidates submit detailed revision control documents, clearly outlining all modifications made to their design proposals and prototype models based on peer feedback with detailed justification
- encourage candidates to produce more detailed drawings that include all required dimensions and material choices to ensure a third party can reproduce it
- support candidates to understand the importance of evaluating their proposals against the design criteria and design brief and then to identify areas for improvement where their design is not meeting the design criteria
- support candidates in their knowledge and understanding of test methods and their limitations, for them to be able to explain their rationale for choosing the testing methods they used
- candidates need to further develop their understanding of efficiency calculations to support the evaluation of their final design evaluation
- encourage candidates to incorporate technical and industry terminology whilst producing their reports and records.

Best practice and guidance to providers on potential areas for improving performance in assessment

It is recommended that providers utilise and deliver the published assessments as formative assessment to support candidates in preparation for summative assessment. This will not only help to prepare candidates but will be an ideal opportunity for marker training and standardisation. It is also recommended that providers share the Guide Standard Exemplification Materials (GSEM) and Grade Standard Exemplification Materials (GrSEMs) with candidates, to support with exemplification of the assessments and evidence outputs.

The assessor and candidates must thoroughly read the assessment to ensure the work is carried out to the required criteria. Moderators will be working to the assessment brief and marking grids and making judgments accordingly.

Appropriate Personal Protective Equipment (PPE) should be worn at all times and assessors should ensure that candidates are working safely and should not come to harm or face risks to their health from the materials, tools or equipment used in the assessment.

Where photographic evidence is requested, ensure all stages of servicing and maintenance activities are included.

A large number of photographs are not required, but they do need to show everything a moderator would require to be able to perform the remote moderation work. Photographs need to be of sufficient resolution to enable “zooming in” to determine quality. Photographs should be collated into one document, clearly labelled, and with commentary if possible.

Videos will need to show specific and important points of the assessment, for instance the candidate completing their handover. In addition, candidates need to show and comment on the documentation required for handover.

Utilisation of the Photographic Evidence Guidance Document would support providers to capture relevant and valuable information for marking and moderation purposes to support practical observation feedback.

Providers should ensure that practical observation forms are detailed, covering all aspects of the activity being observed. The practical observation records should contain accurate information, specific to the candidate being observed and offer differentiating commentary between individual candidate’s performance utilising the marking grid terminology. They should also identify areas of strength and weakness to distinguish between the different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.

Support materials

Sample and Past Occupational Specialism (OS) Assessments:

It is recommended that Providers utilise and deliver the **sample OS** as well as **past OS** (if available) as formative assessment to support candidates in preparation for summative assessment.

Sample and past OS (if available):

[8714-321 D&D Mechanical OS summer 2024](#)

[8714-321 D&D Mechanical OS SAMPLE](#)

Guide Standard Exemplification Material (GSEM) Assessments:

It is also recommended that Providers utilise the **GSEMs** to help understand the standard required to achieve a Distinction and Pass grade.

8714-321 OS Distinction GSEM: [T Level Technical Qualification in Design and Development in Engineering and Manufacturing - Mechanical – Guide Standard Exemplification Materials - Distinction](#)

8714-321 OS Pass GSEM: [T Level Technical Qualification in Design and Development in Engineering and Manufacturing - Mechanical – Guide Standard Exemplification Materials - Pass](#)

Grade Standard Exemplification Material (Grade SEM) Assessments:

It is also recommended that Providers utilise the **Grade SEMs** to help understand the standard that was required in the summer 2024 assessment series to achieve a Distinction and Pass grade.

8714-321 OS Distinction Grade SEM: [T Level Technical Qualification in Design and Development in Engineering and Manufacturing - Mechanical – Grade Standard Exemplification Materials - Distinction](#)

8714-321 OS Pass Grade SEM: [T Level Technical Qualification in Design and Development in Engineering and Manufacturing - Mechanical – Grade Standard Exemplification Materials - Distinction](#)

TQ Occupational Specialism Assessment Process Guide:

The guide gives support to Providers in preparing for and delivering T Level Occupational Specialism assessments.

Link: [TQ Occupational Specialism Assessment process guide \(cityandguilds.com\)](#)

Events and Webinars:

City & Guilds run free webinars and events throughout the year on preparing for and delivering the T Level Occupational Specialisms. The below link provides details on upcoming in person events, live webinars, on-demand webinars, and preparation for the occupational specialism assessment.

Link: [Events and webinars - T Levels | City & Guilds \(cityandguilds.com\)](#)

Grade boundaries

The table below shows the grade mark ranges for the Occupational Specialism **for the summer 2025 series**.

Grade	Mark range
	8714-321
Distinction	70-90
Merit	55-69
Pass	40-54
Unclassified (U)	0-39

T-LEVELS



Get in touch

The City & Guilds Quality team are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

Monday - Friday | 08:30 - 17:00 GMT

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E: technical.quality@cityandguilds.com

W: <http://www.cityandguilds.com/tlevels>

Web chat available [here](#).

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