T Level Technical Qualification in Engineering, Manufacturing, Processing and Control

8713-332 Machining and Toolmaking Occupational Specialism Report (Summer 2024)

Version 1.0

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1.0 08/08/24		

Contents

Foreword

Summer 2024 Results

The occupational specialism qualification is made up of one component, which needs to be successfully achieved to attain the T Level Machining and Toolmaking Occupational Specialism.

We discussed the approach to standard setting/maintaining with Ofqual and the other awarding organisations before awarding this year. We have agreed to take account of the newness of qualifications in how we award this year to recognise that students and teachers are less familiar with the assessments (grading-arrangements-for-vtqsand-technical-qualifications-within-t-levels-in-the-academic-year-2023-to-2024), whilst also recognising the standards required for these qualifications.

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 Engineering and Manufacturing **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 2024 assessment series.

The grade boundaries that were used to determine candidate's final summer 2024 results are also provided. **For summer 2024, as per Ofqual guidance, the approach to grading recognises that these are new qualifications.**

8713-332 Machining and Toolmaking Occupational Specialism

Task 1 Planning

The purpose of task one was to create planning documentation in readiness for machining and toolmaking operations in the manufacture of three components which were then to be assembled as a press die tool assembly. Documentation required included a Risk Assessment, a Method Statement, a Resource List and a Quality Check Sheet.

Most candidates were able to complete a risk assessment for the machining and toolmaking activities to be undertaken. This included the creation of a template, many of which were professionally formatted and detailed. Many candidates were unable to identify all of the major risk factors which were detailed in the indicative content within the marking grid, a common oversight being the omission of electricity from the risk assessment. Some candidates were also unable to distinguish between the terms risk and hazard, whilst others identified machine tools as the hazard.

Method statements produced by the candidates were largely well detailed, following a logical sequence of operations for the manufacture of each component. Some candidates produced individual method statements for each component to be manufactured, whilst others adopted a holistic approach for the complete press die tool assembly.

Resource lists were mainly created in a tabular format and were comprehensive in detail and mostly complete with a justification of why the resource was required.

Quality check sheets were also produced in a tabular format by most candidates. Those which were completed fully contained all drawing dimensions, tolerances, actual dimensions and comments section. Some candidates simply used a binary pass or fail system, whilst others used a colour coded green or red system for pass or fail.

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

Providers must ensure that the major risk factors (high risk) and associated risks (medium and low risk) listed in the indicative content for risk assessment are covered in delivery of the occupational specialism for Machining and Toolmaking. Candidates should also be familiar with the meaning of the terms hazard and risk and be able to identify specific hazards associated when carrying out machining and toolmaking operations.

Candidates should be encouraged to make reference to technical documentation to enhance the outcome of their planning documentation e.g. Zeus Books, Wall Charts, Reference Tables, British and ISO standards, Drill and Tapping Size Charts, Thread and Conversion Tables, engineering drawings, Health and safety regulations and legislation.

Enhanced time management skills would further support candidates in the completion of the four documents required for task one. Some candidates ran out of time and were unable to produce or to fully complete a quality check sheet.

Task 2 Production

The purpose of task two is to prepare the work area for machining and toolmaking operations. The candidates were then tasked with producing the individual components for the press die tool assembly including the die block, the slip ring and the press tool. The components were then assembled in sequence. Candidates were also tasked with applying a surface treatment evenly to the press die tool assembly. Upon completion of manufacturing and assembly operations, the candidates were tasked with reinstating their work areas.

Some low performing candidates found the achievement of tolerances challenging. The majority of errors occurred in the manufacture of the Die Block. The specified general drawing tolerance of ±0.25mm for the die block was achievable for all candidates, however errors were made on several areas including the overall length, depth of shoulders and the positioning and size of the slot. Low performing candidates also had false cuts on machined faces including the shoulders of the die block.

Low performing candidates also found the achievement of dimensional tolerances for the slip ring challenging. The Ø30mm and the Ø40mm and the height of the slip ring had a tolerance of ± 0.1mm, errors were made by candidates in some or all of the dimensions by low performing candidates. Low performing candidates also experienced difficulty in producing the 1mm x 45-degree chamfer, this often left a lip or a burr on the bore after machining.

The machining of the Press Tool and the achievement of dimensional tolerances was consistent across all providers. The pre-programmed CNC Lathes produced components which met the dimensional tolerances specified in the engineering drawing. Some providers were able to utilise two CNC Lathes to produce the component in two operations, mirroring industry practices.

High performing candidates were able to achieve dimensional tolerances on all components produced. Surface defects were minimal, with the occasional exception of marks on the Die Block caused through hard jaws from the 4 Jaw Chuck when carrying out machining of the Ø30 and Ø40mm hole.

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

Candidate skills on the use of milling machines and the achievement of tolerances when machining components using milling machines are an area for development for some providers. This would include accurate calculation of tool positioning using the DRO and ensuring in process checks are carried out frequently to ensure dimensional tolerances are achieved.

Task 3A Quality review

The purpose of Task 3A is for candidates to carry out a full quality inspection of the completed press die tool assembly and then to record their findings on the quality check sheet template that they created as part of Task 1. The candidates were then tasked with giving a demonstration of the assembly of the press die tool in the correct sequence. The

performance of candidates for Task 3A was largely consistent. Low performing candidates were found to have incomplete quality check sheets from Task 1, this impacted on their ability to achieve marks in the higher bands of the marking grid as not all of the dimensions were recorded on the check sheets unless amendments were made by the candidates. Higher performing candidates demonstrated effective and accurate use of precision measuring equipment recording all dimensions on their quality check sheets

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

Candidates need to be more familiar on how to fully utilise the technical drawings in the assignment brief to aid production of the quality check sheet templates to ensure all aspects of the specification are captured in their quality review task.

Task 3B Evaluation and recording

For Task 3B candidates were required to produce a quality inspection report which evaluated the production of the individual components for the press die tool assembly. Candidates had to include the finished sizes of components along with confirmation that the press die tool assembly conforms to the dimensional requirements of the specification. Candidates also were asked to explain the quality checks undertaken and the reasons for their use. In addition, candidates had to create a concessions list for every facet of the assembly that does not conform to the specification, the reasons for occurrence and strategies to prevent reoccurrence. The quality inspection report also required an evaluation of the fitness for purpose of the finished press die tool assembly and the methods of production used by the candidates. Finally, candidates were asked to suggest any improvements or if adaptions were required for the press die tool, including any reasoning and justifications if adaptions or improvements were not required.

Quality inspection reports produced by low performing candidates lacked evaluative commentary and simply focussed upon a review of activities undertaken. The high performing candidates did expand upon the dimensional aspects of the report offering insight into their own performance along with proposals on how they would improve their performance if they were required to manufacture the components making up the press die tool assembly again.

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

It is important that candidates address all aspects of the report and manage their time effectively to fulfil all requirements of the task. Completion of similar formative assessment tasks may further aid preparation for this assessment activity.

Task 3C Handover

For Task 3C candidates were asked to hold a meeting with their supervisor or assessor to complete a handover of the press die tool assembly. The structure of the meeting included confirmation of the work completed by the candidate, an overview of their findings from the quality inspection report and any suggested improvements to the design of the press die tool assembly or the production process used. Finally, candidates were to handover the finished press die tool and the completed quality inspection report.

Handover meetings conducted by low performing candidates were brief and lacked structure. It was also evident that candidates were nervous, however, this was not limited to the low performing candidates. Low performing candidates gave an overview of the work carried out during the assessment, identifying issues they encountered, however, mostly they were unable to suggest improvements to the design or the production processes used. High performing candidates were able to use technical language and industry terminology confidently in describing the processes used, their findings from the quality inspection report and suggested improvements to both processes and design.

Overall, however, most candidates were able to demonstrate a good understanding of industry terminology in the correct context when discussing their individual projects.

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

Candidates should be encouraged to build their confidence in front of a camera during the academic year and formulate verbal presentations in a logical and confident manner utilising industry terminology.

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

It is recommended that providers utilise and deliver the sample assessments as formative assessment to support candidates in preparation for summative assessment. This will not only help prepare candidates but will be an ideal opportunity for marker training and standardisation.

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

Appropriate PPE should be worn at all times and assessors should ensure that candidates are working safely and should not come to harm or risks to health from the materials used in the assessment.

Where photographic evidence is requested ensure completed components and the completed assembly are included.

Photographs do not need to be great in number but 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, and well labelled, and with commentary if possible. Videos will need to show specific and important points of the assessment, for instance the candidate completing quality reviews and handover activities. 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): T Level Practical Assignment - Machining and Toolmaking Technologies: Sample Assessor Pack (cityandguilds.com)

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.

8713-332 OS Distinction GSEM: mpc-gsem-machining--toolmaking-distinction-v2,-d-,0-pdf.ashx (cityandguilds.com)

8713-332 OS Pass GSEM: mpc-gsem-machining--toolmaking-threshold-competence-v2,-d-,0-pdf.ashx (cityandguilds.com)

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 2024 series.**

Grade	Mark range 8713-332
Distinction	67-90
Merit	51-66
Pass	36-50
Unclassified (U)	0-35

Get in touch

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

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Web chat available **here**.

The T Level is a qualification approved and managed by the Institute for Apprenticeships and Technical Education.