T-LEVELS | Institute for Apprenticeships & Technical Education

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

Employer-Set Project (8730-034)

Summer 2023 Marking Grids

City & Guilds | eal

Contents

Contents	2
General marking approach	3
Assessment objectives	5
Employer-set project mark distribution	7
1. Research	8
2. Report	12
3. Design	18
4. Present	26
Maths, English and Digital skills	34
Version control	**Error! Bookmark not defined.**

General marking approach

The following process details at high level the steps that will be undertaken by the external marking teams at City & Guilds following the submission of candidate's submitted evidence (including additional supporting evidence such as videos of presentations etc.).

Process

- Marker scans/reads the candidate's evidence, any notes on the Declaration of Authenticity e.g. regarding level of support recorded and the band descriptors. Evidence contained on the Declaration of Authenticity is taken into account along with all other candidate evidence at the point of marking. The external marker makes a judgement on the level of performance the candidate has demonstrated taking all the evidence into consideration and they then judge the appropriate mark following the normal process.
- Marker makes an initial assessment of the best fit to band.
- Marker reviews the candidate evidence against the initial band descriptor in more detail to decide if the response is securely sitting within the band; i.e. all characteristics described by the band descriptor are seen or it strongly meets the level of performance described by the descriptor holistically:
    - marker will also check the descriptor for the level above
    - if evidence clearly shows some of the characteristics of the higher band, the marker will select a suitable mark at the bottom of that band
    - if not showing characteristics of the higher band, the marker will revert to the original band, selecting a mark at the higher end of that mark range.

  If the response is not securely in the band, but is partially showing the characteristics of the band:
    - marker will check the descriptor of the level below/above
    - marker will decide on a suitable mark either at the bottom of the original band as some characteristics shown, or top of the lower band if it better describes the quality of the characteristics being shown.

  If the response is largely meeting the band, with only a few concerns and is not showing characteristics aligning with the higher or lower bands, the appropriate mark is likely to be in the middle range.

  If there is no alignment with the descriptor, the marker will reassess the starting band, and begin again.
- Based on the level of alignment with the descriptor, the marker will confirm a final mark within the band, bearing in mind the marks available form an evenly distributed scale:
    - if the quality of response fully aligns with the performance described by the descriptor, the marker will assign a high mark within the band
    - if the quality of the response partially aligns with the performance described by the descriptor, the marker will assign a low to medium mark within the band
    - the marker will consider the quality of a range of similar responses (e.g. annotated lead grade exemplification materials, responses reviewed during standardisation, and through experience) and choose a mark that would give an appropriate ranking amongst those responses in relation to the full range of marks available in each band.
- In order to fully assess the evidence, it may be necessary to focus on several distinct aspects. These have been grouped into separate sub-grids to allow the marker to

make separate assessment decisions, rather than attempt to bring disparate elements together as a holistic judgement, to support reliability, validity and manageability for the marker.

- Should a candidate make an error or display a weakness in one task that is further compounded through the inter-dependent nature of the tasks and carry through that error, the marker should penalise the candidate only once. Each task should be considered within the constraints of the marking for the task itself, focusing on the knowledge and skills to be demonstrated in that task. For example, if the candidate does not research suitable options in task 1, when they get to the presentation task 4 where the solution is presented – the marker should focus on looking at how well the candidate presents the solution they are proposing, i.e. it is the presentation and communication skills that hold the main relevance in this task, rather than further penalising the candidate for a less than optimal research and proposal from the initial task 1. Candidates can also use evaluation within later task responses to address issues they have identified.

Assessment objectives

The Employer-Set Project is assessed against five assessment objectives. The assessment objectives are mapped against each task within the marking grids:

AO Ref	Assessment Objective
AO1	Plan their approach to meeting the project brief
AO2	Apply core knowledge and skills as appropriate
• AO2a	○ core knowledge
• AO2b	○ core skills i) **Analysing and interpreting -** Evaluate and confirm the brief with reference to context, objectives and constraints (e.g. requirements, resources, precedents, technical issues, costs, health and safety, regulations, possibilities) ii) **Planning and preparation -** Propose and plan key activities, stages, methods, processes, techniques, documentation, resources (including types of tools and equipment) and risk assessments iii) **Developing responses** - Apply engineering and manufacturing processes to achieve specific objectives and to produce quality outcomes, using relevant techniques and technology, within limits of own authority iv) **Evaluating and quality assuring** - Carry out investigations, generate proposals and options, identify standard components and systems at relevant stages to gather and evaluate relevant evidence and data, and to confirm the suitability of plans, processes, actions and outcomes (including quality control and quality assurance activities) v) **Communication and presentation -** Record, report, communicate and present plans, proposals, processes, issues, risks and outcomes to both technical and non-technical audiences, across a range of suitable formats and media (e.g. diagrams, physical and digital records, presentations)
AO3	Select relevant techniques and resources to meet the brief

AO Ref	Assessment Objective
AO4	Use maths, English and digital skills as appropriate
• AO4a	○ Maths - Use of calculations to determine sizes, tolerance build up, and clearances required for the design
• AO4b	○ English - Demonstration of the ability to explain an approach to a task using written English. This should involve the use of correct engineering terminology, effective punctuation and grammar to clearly explain an approach
• AO4c	○ Digital - Use of CAD systems, researching standards and electronic information from websites to gather information of standard parts
AO5	Realise a project outcome and review how well the outcome meets the brief
• AO5a	○ realise a project outcome – was the right outcome achieved
• AO5b	○ review how well the outcome meets the brief, how well was the brief met, the quality of the outcome in relation to the brief

Employer-set project mark distribution

This table illustrates how the 90 marks for the employer-set project are distributed against the tasks and mapped to each assessment objective. These have been set by subject matter experts and employers and will support the comparability between versions of the employer-set project over time.

Tasks	AO1	AO2a	AO2b	AO3	AO5a	AO5b	Total	AO4a	AO4b	AO4c
1. Research	3	3	6	3	0	0	15	3	3	3
2. Report	3	6	6	3	0	0	18			
3. Design	3	6	6	3	3	3	24			
4. Present	3	6	6	3	3	3	24			
Total	**12**	**21**	**24**	**12**	**6**	**6**	**81**	**9**		**90**
AO marks	12	45		12	12		-	9		90
AO %	13.3%	50%		13.3%	13.3%		-	10%		100%

NB - AO2 collectively must be at least 50% (i.e. 45 marks)

1. Research

<table>
<tr><th colspan="4">Grid 1: AO1, AO2a, AO3 Research (Planning, core knowledge, selecting techniques and resource)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Research notes and analysis (1500 words). This can include volume calculations and initial design sketches, identification of fixing methods and any potential issues that may result in a design not being oil tight, as well as downloads or excerpts from OEM catalogues for wire mesh baskets, handles, drain plugs and material data sheets.
References/sources</td></tr>
<tr><td>Indicative Content

(Summer 2023)</td><td>AO1 – Plan their approach to meeting the project brief
The candidate’s:
coherence of structure of the research notes and analysis.
consideration of the different aspects of the task specifically:
commercially available wire mesh baskets sourced,
any handles fitted to the wire mesh basket,
materials the tank can be economically fabricated from and their thickness,
the shape of the tank,
the method of manufacture,
the materials to fabricate a close-fitting lid to the tank,
a suitable handle for the lid,
commercially available drain plug.
clarity of references to sources of guidance and industry standards.
AO2a – Apply core knowledge
The candidate’s:
confidence and appropriateness of use of terminology.
accuracy of the research notes in relation to sources.
refinement of their approach to the problem in relation to the specification given.
level of detail on research of materials and standard parts.
identification of similar solutions or ones that relate to the provided brief.</td><td>AOs (marks)

AO1 (3)

AO2a (3)

AO3 (3)</td><td>Total marks available

9</td></tr>
</table>

Grid 1: AO1, AO2a, AO3 Research (Planning, core knowledge, selecting techniques and resource)			
	AO3 – Select relevant techniques and resources to meet the brief The candidate's: • selection of research techniques and suitability of resources to meet the brief • matching of resources and information to the various parts of the research requirement – use of specifications, diagrams, downloads etc. to match the determinations that must be made. • clarity of references to sources of guidance and industry standards in the technical brief.		

Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given

Band 1 descriptor			Band 2 descriptor			Band 3 descriptor		
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Some evidence of a planned approach to research. (AO1)			Approach to research and collation of information shows planning and consistency. (AO1)			Requirements of the brief are considered consistently throughout the research and information collation – clear evidence of methodical and thorough approach to research and information gathering. (AO1)		
Some elements of core knowledge referenced but focus may be imbalanced and more focused on one area than another. (AO2a)			Core knowledge applied in most areas of the brief requirements. (AO2a)			Core knowledge applied in all areas of the brief requirements. (AO2a)		
Research techniques and resources clear as part of evidence submission. (AO3)			Evidence of a range of techniques and resources used and referenced, with different source types considered. (AO3)			Evidence of comprehensive research techniques, use of resources, and full range of sources. All sources fully detailed and presented fully and consistently. (AO3)		

<table>
<tr><th colspan="4">Grid 2: AO2b Research (Core Skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Research notes and analysis (1500 words). This can include volume calculations and initial design sketches identification of fixing methods and any potential issues that may result in a design not being oil tight, as well as downloads or excerpts from OEM catalogues for wire mesh baskets, handles, drain plugs and material data sheets.
References/sources</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO2b – Application of core skills
Core skills (definitions of each skill can be found in the Assessment Objective table at the front of this marking scheme):
Analysing and interpreting
Planning and preparation
Developing responses
Evaluating and quality assuring
Communication and presentation
The candidate’s:
demonstration of judgement and reasoning in relation to the review of the requirements from the brief and the content within the notes.
details of research on materials and OEM parts in order to meet the Chief Engineer’s requirements.
effectiveness of communication of research conducted to meet requirements outlined in the brief – clarity and conciseness of response.
expression of ideas in associated research analysis and level to which they are supported e.g. through inclusion of images and level of referencing to sources.
evidence of planning in research in terms of consistency and balance of response (time spent consistently on researching different elements).</td><td>AOs (marks)

AO2b (6)</td><td>Total marks available

6</td></tr>
</table>

Grid 2: AO2b Research (Core Skills)					
Marking descriptors – All versions Note: where there is insufficient evidence to award a mark, a zero mark may be given					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Some basic elements of core skills drawn on and evidenced within task response - limited use of skills in relation to brief requirements. (AO2b)		A range of core skills applied and evidenced consistently in task response in relation to different elements of the project brief. (AO2b)		Core skills applied consistently and comprehensively throughout task completion with - full range of core skills evidenced. (AO2b)	

2. Report

<table>
<tr><th colspan="4">Grid 3: AO1, AO3 Report (Planned approach, selecting techniques)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Report (2000 words) which outlines suggestions when designing and manufacturing a quenching tank. This can include downloads from Original Equipment Manufacturers (OEM) catalogues showing tooling aids, and any basic design sketches to support the intended approach as detailed in the report.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO1 – Plan their approach to meeting the project brief
The candidate’s:
planning of their report, in consistency and balance of coverage of points.
coverage of the requested elements of the task, specifically:
which basket has been sourced and why other options have been rejected,
the volume calculations for the basket and how this influences the size and shape of the overall tank,
the materials the tank and lid are to be fabricated from, material thickness considerations, and alternatives that have also been considered,
the allowances made for localised heating of parts of the tank,
the allowances made for the volume of components being quenched,
any space required due to increased volume when boiling is observed,
the selection and justification of handles and drain plugs should be included in your report along with the benefits of using the specific options selected.
planning and fitting the different elements of the brief together to produce a correct response.
level of detail provided of any assumptions related to the design problem detailed in the task.
balance to the level/amount of detail included in report and content/detail in the submitted evidence.
AO3 – Select relevant techniques and resources to meet the brief
The candidate’s:</td><td>AOs (marks)

AO1 (3)

AO3 (3)</td><td>Total marks available

6</td></tr>
</table>

Grid 3: AO1, AO3 Report (Planned approach, selecting techniques)			
	• selection of information and researched elements (as provided in the research notes from task 1) and application of them to different elements of the report. • matching of resources (downloads, standard parts, Industry standards, specification extracts) and other information to the various parts of the research requirement to support the determinations that must be made.		

Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given

Band 1 descriptor		Band 2 descriptor		Band 3 descriptor	
1	**2**	**3**	**4**	**5**	**6**
Some evidence of a planned approach to task, response may lack detail and required information. (AO1) Some relevant techniques used in the preparation and presentation of report and associated information. (AO3)		Approach to report and required information is planned, organised and complete. (AO1) Relevant techniques and industry conventions used throughout the preparation and presentation of report. (AO3)		Approach to report and required information fully comprehensive and in line with standard industry practices. (AO1) Preparation and presentation of report and associated information is fully in line with industry conventions. (AO3)	

<table>
<tr><th colspan="8">Grid 4: AO2a Report (Core Knowledge)</th></tr>
<tr><td>Guidance for markers</td><td colspan="7">Only the following evidence must be used to assess performance against this marking grid:
Report (2000 words) which outlines suggestions when designing and manufacturing a quenching tank. This can include downloads from Original Equipment Manufacturers (OEM) catalogues showing tooling aids, and any basic design sketches to support the intended approach as detailed in the report.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td colspan="5">AO2a – Apply core knowledge
The candidate’s:
application of core knowledge to the preparation of the report.
choice of language and information used, its technical level and consistency with the intended audience.
use of technical terminology and accuracy when describing the considerations for the tank design, and how it meets the requirements of the brief.
intended approach proposed, how well the response aligns to industry guidance, has the potential to be implemented and their technical sense and level of consideration of safety factors.</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO2a (6)</td><td>6</td></tr>
<tr><td colspan="8">Marking descriptors – All versions
Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><td colspan="2">Band 1 descriptor</td><td colspan="2">Band 2 descriptor</td><td colspan="4">Band 3 descriptor</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td colspan="3">6</td></tr>
<tr><td colspan="2">Some elements of core knowledge drawn on and evidenced – limited comprehension of knowledge in relation to brief requirements e.g. brief requirements omitted indicating lack of knowledge of that area. (AO2a)</td><td colspan="2">Knowledge from across the core applied and evident in relation to different elements of the project brief. (AO2a)</td><td colspan="4">Core knowledge applied consistently throughout response with minimal technical inaccuracies. (AO2a)</td></tr>
</table>

Grid 4: AO2a Report (Core Knowledge)		
Some links to the application of core knowledge to support judgements, but connections are not always clear and accurate. (AO2a)	Links to the application of core knowledge to justify and support judgements, but with some gaps or inaccuracies. Concepts explained/referenced clearly and correctly. (AO2a)	Connections between elements of core knowledge exploited to strengthen arguments and demonstrate understanding. (AO2a)

<table>
<tr><th colspan="4">Grid 5: AO2b Report (Core skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Report (2000 words) which outlines suggestions when designing and manufacturing a quenching tank. This can include downloads from Original Equipment Manufacturers (OEM) catalogues showing tooling aids, and any basic design sketches to support the intended approach as detailed in the report.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO2b – Application of core skills
Core skills (definitions of each skill can be found in the Assessment Objective table at the front of this marking scheme):
Analysing and interpreting
Planning and preparation
Developing responses
Evaluating and quality assuring
Communication and presentation
The candidate’s:
incorporation of the required aspects in the response – use of logical and synergised approach to requirements.
evaluation of health and safety considerations as well as consideration of quality assurance relating to the approach proposed, how it could be implemented within a process and communication considerations.</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO2b (6)</td><td>6</td></tr>
</table>

Grid 5: AO2b Report (Core skills)					
Marking descriptors – All versions Note: where there is insufficient evidence to award a mark, a zero mark may be given					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Some elements of core skills drawn on and evidenced within task response - limited use of skills in relation to brief requirements. (AO2b) Response has limited logic and shows superficial coherence between different aspects of the brief. (AO2b)		A range of core skills applied and evident in task response in relation to different elements of the project brief. (AO2b) Response is logical and shows some coherence between different aspects of the brief. (AO2b)		Core skills applied consistently throughout task completion with - full range of core skills evidenced. (AO2b) Response is logical and demonstrates detailed coherence between different aspects of the brief. (AO2b)	

3. Design

<table>
<tr><th colspan="4">Grid 6: AO1, AO3 Design (Planned approach, selecting techniques)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Two Assembly drawings (one for the tank and one for the lid) this should consist of assembly drawings either produced using a CAD package or by hand as a paper-based drawing. The dimensioned assembling drawing should address; dimensions of the tank and its separate lid, the size of the wire mesh basket, the location and basic dimensions of the drain plug, the material type and thickness, the construction method, and a Bill of Materials (BOM).
Draft iterations of your design to show how the design has developed.
Two A4 sides of supporting calculations and notes this includes any relevant design calculations related to your assembly drawing and notes reflecting on how well the quenching tank meets the outlined requirements.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO1 – Plan their approach to meeting the project brief
The candidate’s:
planning of the design.
inclusion of required considerations and elements as detailed in the task outline:
the size and shape of a fabricated oil quenching tank that can hold a volume of oil, between 20 and 50 litres that contains a reasonably well-fitting wire mesh basket capable of being lifted out,
the amount of volume required to allow for the size of the components placed into the oil and boiling effect whilst workpieces are being quenched,
the size and type of an oil tight drain point fitted low down on one of the sides to allow controlled draining of the tank,
a well-fitting lid with a handle to enable it to be easily lifted on and off as required.
achievability and realism of the overall design.
AO3 – Select relevant techniques and resources to meet the brief
The candidate’s
demonstration of judgements in the design coverage of required elements, and level of logic applied to the design.</td><td>AOs (marks)

AO1 (3)

AO3 (3)</td><td>Total marks available

6</td></tr>
</table>

Grid 6: AO1, AO3 Design (Planned approach, selecting techniques)						
	• use of technical terminology, scales and symbols as part of annotations and labels - consistency of information provided and appropriateness for intended audience.					
Marking descriptors – All versions Note: where there is insufficient evidence to award a mark, a zero mark may be given						
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**		
1	**2**	**3**	**4**	**5**	**6**	
Some evidence of a planned approach to design task, response may lack detail and calculation information. (AO1) Some relevant techniques used in the preparation and presentation of drawings/sketches and associated calculations. (AO3)		Approach to design and calculation information is planned, organised and complete. (AO1) Relevant techniques and industry drawing conventions used throughout the preparation and presentation of drawings/sketches and associated calculations. (AO3)		Approach to design and calculations fully comprehensive and in line with standard industry practices. (AO1) Preparation and presentation of drawings/sketches and associated calculations is fully in line with industry drawing conventions showing the use of all correct techniques. (AO3)		

<table>
<tr><th colspan="7">Grid 7: AO2a Design (Core Knowledge)</th></tr>
<tr><td>Guidance for markers</td><td colspan="6">Only the following evidence must be used to assess performance against this marking grid:
Two Assembly drawings (one for the tank and one for the lid) this should consist of assembly drawings either produced using a CAD package or by hand as a paper-based drawing. The dimensioned assembling drawing should address; dimensions of the tank and its separate lid, the size of the wire mesh basket, the location and basic dimensions of the drain plug, the material type and thickness, the construction method, and a Bill of Materials (BOM).
Draft iterations of your design to show how the design has developed.
Two A4 sides of supporting calculations and notes this includes any relevant design calculations related to your assembly drawing and notes reflecting on how well the quenching tank meets the outlined requirements.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td colspan="4">AO2a – Apply core knowledge
The candidate’s
application of core knowledge to the preparation of the designs.
application of associated design calculations.
level of detail of relevant standard parts and components, materials used and matched to components / parts, clear indications of sizes and volumes required.
use of technical terminology, terms and scales on diagrams and calculations.</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO2a (6)</td><td>6</td></tr>
<tr><td colspan="7">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><td colspan="2">Band 1 descriptor</td><td colspan="2">Band 2 descriptor</td><td colspan="2">Band 3 descriptor</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td colspan="2">Some elements of core knowledge drawn on and evidenced - limited comprehension of knowledge in relation to brief requirements e.g. brief requirements omitted indicating lack of knowledge of that area. (AO2a)</td><td colspan="2">Knowledge from across the core applied and evident in relation to different elements of the project brief. (AO2a)</td><td colspan="2">Core knowledge applied consistently throughout response with minimal technical inaccuracies. (AO2a)</td></tr>
</table>

Grid 7: AO2a Design (Core Knowledge)		
Supporting information details some links to the application of core knowledge to support judgements, but connections are not always clear and accurate. (AO2a)	Supporting information details links to the application of core knowledge to justify and support judgements, but with some gaps or inaccuracies. (AO2a)	Connections between elements of core knowledge exploited to strengthen arguments and demonstrate understanding. (AO2a)

<table>
<tr><th colspan="4">Grid 8: AO2b Design (Core skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Two Assembly drawings (one for the tank and one for the lid) this should consist of assembly drawings either produced using a CAD package or by hand as a paper-based drawing. The dimensioned assembling drawing should address; dimensions of the tank and its separate lid, the size of the wire mesh basket, the location and basic dimensions of the drain plug, the material type and thickness, the construction method, and a Bill of Materials (BOM).
Draft iterations of your design to show how the design has developed.
Two A4 sides of supporting calculations and notes this includes any relevant design calculations related to your assembly drawing and notes reflecting on how well the quenching tank meets the outlined requirements.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO2b – Application of core skills
Core skills (definitions of each skill can be found in the Assessment Objective table at the front of this marking scheme):
Analysing and interpreting
Planning and preparation
Developing responses
Evaluating and quality assuring
Communication and presentation
The candidate’s:
professionalism of the presentation of the design and to what extent it is conveyed using industry standard notation and features.
use of recognised methods of presentation and comprehensiveness of completion (e.g., task content requirements).
comprehensive use of designs and calculations to meet the activities required.
coverage of the activities required to complete the design.
structure, logic and coherence of the supporting notes and coverage of the required considerations.</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO2b (6)</td><td>6</td></tr>
<tr><td colspan="4">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
</table>

Grid 8: AO2b Design (Core skills)					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Some elements of core skills drawn on and evidenced within task response - limited use of skills in relation to brief requirements. (AO2b)		A range of core skills applied and evident in task response in relation to different elements of the project brief. (AO2b)		Core skills applied consistently throughout task completion with - full range of core skills evidenced. (AO2b)	

<table>
<tr><th colspan="4">Grid 9: AO5a, AO5b Design (Realise/Review)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Two Assembly drawings (one for the tank and one for the lid) this should consist of assembly drawings either produced using a CAD package or by hand as a paper-based drawing. The dimensioned assembling drawing should address; dimensions of the tank and its separate lid, the size of the wire mesh basket, the location and basic dimensions of the drain plug, the material type and thickness, the construction method, and a Bill of Materials (BOM).
Draft iterations of your design to show how the design has developed.
Two A4 sides of supporting calculations and notes this includes any relevant design calculations related to your assembly drawing and notes reflecting on how well the quenching tank meets the outlined requirements.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO5a – realise a project outcome – was the right outcome achieved
The candidate’s:
effectiveness of the prepared task response and to what extent it meets the requirements of the given tank design specification/brief.
evidence of how ‘fit for purpose’ and ‘believable’ the solution is to meet requirements.
feasibility of the solution presented, and level of amendments required.
AO5b – review how well the outcome meets the brief, how well was the brief met, the quality of the outcome in relation to the brief
The candidate’s:
evidence of evaluation and review of requirements as presented in reflection notes or in iterations of designs (if provided) – indications on how these have been met with proposed task response.
depth and detail of any notes on drawings.</td><td>AOs (marks)

AO5a (3)

AO5b (3)</td><td>Total marks available

6</td></tr>
<tr><td colspan="3">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
</table>

Grid 9: AO5a, AO5b Design (Realise/Review)					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Response partially addresses some of the task requirements. (AO5a) Evaluation and review do not clearly address how well the task outcome met the brief and lacks clarity and reasoning in places. (AO5b)		Response addresses all aspects of the task requirements. (AO5a) Evaluation and review address how well the task outcome was achieved. (AO5b)		Response fully addresses all aspects of all the elements of the task requirements. (AO5a) Evaluation and review are comprehensive and specifically addresses how well the task outcome was achieved. (AO5b)	

4. Present

<table>
<tr><th colspan="4">Grid 10: AO1, AO3 Present (Planned approach, selecting techniques)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Video recording of presentation
Presentation materials (slides, handouts, notes etc)
Presentation Q&A Record (if this cannot be heard on the video)
The presentation should cover; consideration of both the specific and general issues identified in the brief, challenges that were found when selecting and designing and how well your design and proposal addresses the requirements of the brief and what changes you would make if repeating the project.

Audience: Presentative of the client, a mixture of both technical and non-technical backgrounds. Chief engineer and from the user’s perspective.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO1 – Plan their approach to meeting the project brief
The candidate’s:
level of planning in relation to their presentation.
logic, order and coherence of the presentation (e.g. containing an introduction to themselves, an introduction to what will be covered within the presentation, a conclusion, and an invitation to ask questions from the audience).
AO3 – Select relevant techniques and resources to meet the brief
The candidate’s:
selection and application of techniques for delivering the presentation, how appropriate and effective they are (e.g., use of slide deck, reference to notes, provision of handouts, use of other reference material).
use of positive non-verbal communication during delivery (e.g., maintaining eye contact with the audience) and the clarity of speaking/delivery, and the level of which distraction behaviour is displayed (e.g. rocking, tapping., pausing).</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO1 (3)

AO3 (3)</td><td>6</td></tr>
</table>

Grid 10: AO1, AO3 Present (Planned approach, selecting techniques)					
Marking descriptors – All versions Note: where there is insufficient evidence to award a mark, a zero mark may be given					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
The presentation lacks structure and does not always follow a logical approach due to ineffective planning. (AO1) Technique used to deliver the presentation is sometimes effective. However technical information is not always complete and accurate. (AO3)		The presentation is structured and follows a logical approach in response to the task with evidence of planning. (AO1) Techniques used to deliver the presentation are mostly effective. The technical information provided is accurate most of the time with valid reasoning. (AO3)		The presentation is organised, structured and logical in its approach. It is clear that the presentation content has been considered in terms of its audience. (AO1) Techniques used to deliver the presentation are effective with well justified reasoning behind the information provided. (AO3)	

<table>
<tr><th colspan="4">Grid 11: AO2a Present (Core Knowledge)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Video recording of presentation
Presentation materials (slides, handouts, notes etc)
Presentation Q&A Record (if this cannot be heard on the video)
The presentation should cover; consideration of both the specific and general issues identified in the brief, challenges that were found when selecting and designing and how well your design and proposal addresses the requirements of the brief and what changes you would make if repeating the project.

Audience: Presentative of the client, a mixture of both technical and non-technical backgrounds. Chief engineer and from the user’s perspective.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO2a – Apply core knowledge
The candidate’s
use of core knowledge in the preparation of the presentation.
demonstration of judgements in the preparation of the presentation, how well they are reasoned and cover the key features task requirements.
level to which the presentation defines the challenges interpreted from within the brief and explanations as to how these have been overcome in the solutions presented.
considerations linked to the requirement points as indicated within the brief – links made and articulated.
confidence and accuracy of the candidate’s responses to questions presented by the tutor/client.
use of technical language (with consideration of target audience) and level of evidence that demonstrates understanding of the factors influencing the task outcome.</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO2a (6)</td><td>6</td></tr>
<tr><td colspan="4">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
</table>

Grid 11: AO2a Present (Core Knowledge)					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Engineering concepts relating to the core knowledge conveyed through the presentation - these may not always be accurate or be directly linked to the brief requirements. (AO2a) Terminology used may have inaccuracies and content provided may include inconsistencies and not clear to the target audience. (AO2a)		Engineering concepts relating to the core knowledge are coherent throughout the presentation to meet the requirements of the brief set. (AO2a) Terminology used is mostly accurate with minor errors. The content provided is mostly correct but does not always consider the target audience/ may be imbalanced or biased (e.g. to either technical or non-technical focus). (AO2a)		Engineering concepts relating to the core knowledge are coherent with clear justifications on how these are applied in response to the brief requirement. (AO2a) Terminology used is accurate and error free. The content provided is clear and easily understood by the target audience, with no bias in tone/ imbalance across audience type (where appropriate). (AO2a)	

<table>
<tr><th colspan="4">Grid 12: AO2b Present (Core skills)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Video recording of presentation
Presentation materials (slides, handouts, notes etc)
Presentation Q&A Record (if this cannot be heard on the video)
The presentation should cover; consideration of both the specific and general issues identified in the brief, challenges that were found when selecting and designing and how well your design and proposal addresses the requirements of the brief and what changes you would make if repeating the project.

Audience: Presentative of the client, a mixture of both technical and non-technical backgrounds. Chief engineer and from the user’s perspective.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO2b – Application of core skills
Core skills (definitions of each skill can be found in the Assessment Objective table at the front of this marking scheme):
Analysing and interpreting
Planning and preparation
Developing responses
Evaluating and quality assuring
Communication and presentation
The candidate’s:
effectiveness in communicating their solution and considerations – including fluency, clarity and conciseness.
professionalism of presentation resources (slides/presentation methods).
clarity and size of images and figures, inclusion of labels, font size.
use of digital features to enhance the quality of the presentation.</td><td>AOs (marks)

AO2b (6)</td><td>Total marks available

6</td></tr>
<tr><td colspan="3">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
</table>

Grid 12: AO2b Present (Core skills)					
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**	
1	**2**	**3**	**4**	**5**	**6**
Communication of engineering concepts is sometimes effective. The delivery of technical information may lack accuracy and clarity for the target audience. (AO2b)		Engineering concepts are communicated effectively most of the time in an appropriate manner for the target audience. There are minor inaccuracies in the delivery of information which causes a lack of clarity in some instances. (AO2b)		Highly effective communication of engineering concepts is appropriate for the target audience. Technical information is presented accurately and delivered with clarity. (AO2b)	

<table>
<tr><th colspan="4">Grid 13: AO5a, AO5b Present (Realise outcome, review outcome)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Video recording of presentation
Presentation materials (slides, handouts, notes etc)
Presentation Q&A Record (if this cannot be heard on the video)
The presentation should cover; consideration of both the specific and general issues identified in the brief, challenges that were found when selecting and designing and how well your design and proposal addresses the requirements of the brief and what changes you would make if repeating the project.

Audience: Presentative of the client, a mixture of both technical and non-technical backgrounds. Chief engineer and from the user’s perspective.</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td>AO5a - realise a project outcome – was the right outcome achieved
The candidate’s:
effectiveness of the candidate’s project response and how fully it meets the requirements of task four covering the challenges presented by the product design specification and how these have been overcome.
clarity of identification of which areas of the brief were/were not satisfied.
reflections on additional aspects of research/planning process, rework of research/planning that would improve/enhance a future project outcome or if the proposed response was to be re-worked.
AO5b – review how well the outcome meets the brief, how well the brief was met, the quality of the outcome in relation to the brief
The candidate’s:
clarity within their evaluation and review of the challenges of the product design specification, and indications within the presentation on how these have been overcome.
clarity of explanation of how the final design addresses the requirements of the product design specification brief, including any featured considered by the candidate to be improved.</td><td>AOs (marks)

AO5a (3)

AO5b (3)</td><td>Total marks available

6</td></tr>
</table>

Grid 13: AO5a, AO5b Present (Realise outcome, review outcome)						
	• evaluation on ideas relating to how earlier tasks could be built on and indications of reasons why this has happened.					
Marking descriptors – All versions Note: where there is insufficient evidence to award a mark, a zero mark may be given						
Band 1 descriptor		**Band 2 descriptor**		**Band 3 descriptor**		
1	**2**	**3**	**4**	**5**	**6**	
Project outcome as a whole partially addresses some of the brief requirements. Articulates some challenges encountered. (AO5a) No or minimal reasons and justification in how effectively the brief was met across project tasks. (AO5b)		Project outcome as a whole address all aspects of the brief requirements. Articulates all challenges encountered and attempts to overcome them. (AO5a) There is reason and justification in how effectively some areas of the brief were met across project tasks. (AO5b)		Project outcome as a whole fully addresses all aspects of the brief requirements and considers alternative options where appropriate. Articulates fully all challenges encountered and comprehensively covers how they were overcome. (AO5a) Detailed reasoning behind how successfully the project brief was met across project tasks. (AO5b)		

Maths, English and Digital skills

<table>
<tr><th colspan="5">Grid 14: AO4a (Maths)</th></tr>
<tr><td>Guidance for markers</td><td colspan="4">Only the following evidence must be used to assess performance against this marking grid:
Volume calculations and initial design sketches (Task 1 & 2)
Assembly drawings – dimensions and scaling (Task 3)
Design calculations (Task 3)</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td colspan="2" rowspan="2">The candidate’s:
use of appropriate mathematics in relation to design development and associated calculations.
accuracy and use of calculated measurements, scales etc. as part of the design and completion of drawings.</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO4a (3)</td><td>3</td></tr>
<tr><td colspan="5">Marking descriptors – All versions
Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><th>Band 1 descriptor</th><th>Band 2 descriptor</th><th colspan="3">Band 3 descriptor</th></tr>
<tr><td>1</td><td>2</td><td colspan="3">3</td></tr>
<tr><td>Limited mathematical concepts and calculations applied. (AO4a)

Workings or techniques omitted as part of calculations, assumptions lack detail and full definition. Workings shown but calculation errors made/ inaccurate execution. (AO4a)</td><td>A range of mathematical concepts and calculations shown and applied appropriately. (AO4a)

Working contains inaccuracies or could be more efficient (i.e. expressed in shorthand). Workings inconsistently shown. (AO4a)</td><td colspan="3">Mathematical approaches and concepts applied fully and consistently. (AO4a)

Calculations presented accurately and in correct format, workings shown and evidence of checking to ensure correct results (e.g. estimation workings, reverse calculation checks). (AO4a)</td></tr>
</table>

<table>
<tr><th colspan="4">Grid 15: AO4b (English)</th></tr>
<tr><td>Guidance for markers</td><td colspan="3">Only the following evidence must be used to assess performance against this marking grid:
Research notes (Task 1)
Report (Task 2)
Assembling drawings & supporting notes (Task 3)
Presentation delivery (orally) and materials to support presentation (e.g. slides etc) (Task 4)</td></tr>
<tr><td rowspan="2">Indicative Content

(Summer 2023)</td><td rowspan="2">The candidate’s:
use of appropriate and accurate English.
clarity and articulateness of use of English to present information and ideas.
accuracy of grammar, spelling and punctuation.
use of terminology, which is technical and consistent with the intended audience (people from both technical and non-technical backgrounds) .
confidence in the use of language during verbal presentations, level of articulation and clarity in the delivery of information to summarise information/ideas.</td><td>AOs (marks)</td><td>Total marks available</td></tr>
<tr><td>AO4b (3)</td><td>3</td></tr>
<tr><td colspan="4">Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given</td></tr>
<tr><th>Band 1 descriptor</th><th>Band 2 descriptor</th><th colspan="2">Band 3 descriptor</th></tr>
<tr><td>1</td><td>2</td><td colspan="2">3</td></tr>
<tr><td>Evidence within task responses lacks structure where outcome is partially understandable. Communication style is generally appropriate to the outcome but has some inconsistencies across tasks. (AO4b)

Meaning is clear, but the language is not always fluent. Grammar and/or spelling contain</td><td>Evidence within task responses uses conventional structure which is understandable. Communication style is appropriate to the outcome across most tasks. (AO4b)

Meaning is clear, language is fluent, although the response may contain colloquialisms or</td><td colspan="2">Evidence within task responses uses a structure which makes it easy to fully understand. Communication style is appropriate to the outcome across all tasks. (AO4b)

Meaning is clear, language is fluent and consistent across tasks. Grammar and spelling</td></tr>
</table>

Grid 15: AO4b (English)		
errors or inconsistencies. Audibility of oral presentation is inconsistent. (AO4b)	jargon etc. Grammar and spelling are mainly accurate. Audibility of oral presentation is good. (AO4b)	are consistently accurate across tasks. Deploys a range of grammatical constructions. Audibility of oral presentation is excellent. (AO4b)

Grid 16: AO4c (Digital)			
Guidance for markers	**Only** the following evidence must be used to assess performance against this marking grid: • Types of sources used for Research (Task 1) • Assembly drawings (Task 3) • Presentation materials (slides, handouts, notes etc) (Task 4)		
Indicative Content (Summer 2023)	The candidate's: • use of appropriate digital resources to meet task requirements (e.g. presentation, internet research). • application of features available within digital resources where appropriate (e.g. formatting, layout, presentation modes, animations/transitions in presentation etc). • delivery of the presentation for task four using appropriate software. • range of digital options used across tasks, the extent to which they have been used to add value and their effectiveness of use. • use of current digital techniques, resources and sources in adherence with industry practice, convention and trends.	**AOs (marks)** **AO4c (3)**	**Total marks available** **3**

Marking descriptors – All versions

Note: where there is insufficient evidence to award a mark, a zero mark may be given

Band 1 descriptor	Band 2 descriptor	Band 3 descriptor
1	**2**	**3**
Digital technology attempted as part of task responses. (AO4c)	Consideration and use of basic digital options / features to strengthen task responses throughout project across tasks. (AO4c)	Digital options applied effectively in line with industry practices / best practice, demonstrating use of range of technology features. Digital techniques used effectively to add value to task responses. (AO4c)

Get in touch

City & Guilds Technicals Quality Team

We 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:

T: 0300 303 53 52 (Monday - Friday | 08:30 - 17:00 GMT)

E: **technicals.quality@cityandguilds.com**

W: cityandguilds.com/tlevels

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

Copyright in this document belongs to, and is used under licence from, the Institute for Apprenticeships and Technical Education, © 2023. 'T-LEVELS' is a registered trademark of the Department for Education. 'T Level' is a registered trademark of the Institute for Apprenticeships and Technical Education. 'Institute for Apprenticeships & Technical Education' and logo are registered trademarks of the Institute for Apprenticeships and Technical Education.

Every effort has been made to ensure that the information contained in this publication is true and correct at time of publication. However, City & Guilds products and services are subject to continuous development and improvement, and the right is reserved to change products and services from time to time. City & Guilds cannot accept responsibility for any loss or damage arising from the use of information in this publication.

City & Guilds Limited. All rights reserved. City & Guilds is a trademark of City & Guilds Limited, a company registered in England and Wales (company number 16513878). City and Guilds Group, Giltspur House, 5–6 Giltspur Street, London EC1A 9DE