



Qualification title: Level 3 Diploma in Engineering Construction	Qualification number: 2660
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Guidance relating to all centre devised units for this qualification

The following guidance applies to all of the centre devised units listed. Where individual units require specific guidance, this is provided in the next section; Unit specific guidance.

Generic guidance for units: 302-321**Task Setting:**

A centre may set a separate assignment for each unit, however, assignments covering more than one unit are feasible as long as sufficient evidence can be produced that will meet the Assessment Criteria for all of the units, and as long as the grade for each unit can be separately identified. The evidence relating to each unit must be identified and marked separately.

For example, centres may choose to set one assignment which covers some or all the mandatory units an occupational pathway. A sample assignment is available which covers units 311 Interpret information and mark out pipe work materials and 312 Preparation, fabrication and joining of pipe work assemblies which provides an example of this approach.

The products of one task (e.g. covering one unit) can be used as a resource for other tasks as long as the candidate will not be disadvantaged in doing so – i.e. the assessor must check that the product from the initial task is appropriate and will allow the candidate full access to higher grades in the further tasks for other units.

Centres may also wish to review the assignments that are available for the Level 3 Diploma in Engineering (2850) which may include tasks that centres could include in their centre devised assignments. They are available from: **www.cityandguilds.com**

Task setting:

An assignment will be made up of one or more task.

Each task will consist of:

- planning and preparation
- execution of the activity
- inspection of the finished work
- recording and reporting on the completed task
- carrying out tests, calculations and measurements where appropriate.



Personal Protective Equipment (PPE) should be selected and used by the candidate as required.

In order to ensure all the knowledge requirements are covered task/s should be included to assess knowledge which cannot be inferred from practical activities, this could be through reports, professional discussion or short answer questions. The example assignment for Units 311 and 312 contains short answer questions which may be used for these units.

Forms of Evidence:

It is expected that the following forms of evidence will be produced for these units:

- candidate report (fronted by GF2/3) and discussion with assessor (recorded on GF1)
- inspection report and/or test report including marked up diagrams, test data and conclusions where appropriate (centre devised form or GF1)
- report, either on pre-prepared pro forma supplied by the assessor, or a written report and assessor checklist (fronted by GF2/3)
- written report to include planning of the task, annotated illustrations of the process (e.g. drawings, photographs). (Any illustrations must clearly state what the candidate is doing/did) and completed job card and/or inspection report (fronted by GF2/3)
- photographic evidence or actual work piece (fronted by GF2/3).

All candidate produced material should be fronted by GF2/3 and any evidence recorded by the assessor should be on GF1 or where appropriate a centre devised alternative, or media recording. Audio or video recordings must be securely saved as evidence, clearly identified as relating to the candidate in question and accessible to the Internal & External Verifier).

Conditions:**Practical tasks**

The practical tasks must take place in an appropriately equipped area in the centre in a workshop or outdoor facility.

Assessing knowledge

Tasks should be included to assess knowledge which cannot be inferred from practical tasks. This could be through, evaluation reports, professional discussion or short answer questions.

Underpinning knowledge questions

The short answer underpinning knowledge questions must all be taken under supervised conditions as closed-book tests and must not be completed as homework.

This means that all the activities will be completed with the assessor, or other designated supervisor, present. Strict exam regulations (eg JCQ ICE) do not apply; it is envisaged that most candidates will take the short answer questions in their normal learning environment with their own tutor present. Alternatively, assessors may ask the questions orally and record individual candidate's responses on the assignment evidence recording form.



Unit specific guidance

This guidance relates to the individual unit only and is in addition to any generic guidance specified for it above.

Unit	Unit details		
302	Title: Interpreting information and marking out fabrication materials for steel erecting	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with following prepared sketches/drawings to complete a material list including all measurements and grades of steel required to pre check and mark out to a specification for the erecting of steel work. This will include metric and imperial units of measurement and materials as described in the range for this unit.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing a set conditional material list • marking out erecting components, possibly end plates, cleats, purlin bars, beams or columns of various grades. <p>Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 302.1, 302.3 and 302.4.</p>		

Unit	Unit details		
303	Title: Hand cutting and shaping processes	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with following a prepared drawing to extract information in order to prepare a risk assessment, mark out, cut and prepare holes for steelwork components. Tools to be used will include hand and powered tools. Forms to include chip forming and non chip forming methods.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • cutting and notching e.g. beams, columns, bracings and brackets to a required dimension • marking out and drilling holes • cutting plate work formations, including square and notch • hand cutting angular bracings, cleats and brackets • plan and undertake shaping operations • Inspect shaped products for defects. 		



Tolerances should be included in the product specification as they will assist with grading.
 In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 303.1, 303.3 and 303.5

Unit	Unit details		
304	Title: Assembly and erection of structural steelwork	Graded: Pass/Merit/Distinction	Sample assessment: No
<p>Task Setting: Candidates will be tasked with preparing work areas, equipment and materials to erect/assemble steelwork assemblies.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • using various lifting equipment, tools and process to assemble , erect and join a steelwork fabrication • completing point of work/ risk assessments • following lift plans/ method statements at all times. <p>Steelwork assemblies to be erected or assembled could include portal frames, roof sections, beam and column assemblies, bracings and brackets.</p> <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 304.1, 304.3, 304.5.</p>			
<p>Conditions For tasks covering learning outcomes 6.5 and 6.6, candidates must be able to access engineering construction sites or a replicated environment.</p>			



Unit	Unit details		
305	Title: Interpreting information and marking out fabrication materials	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with following given sketches/drawings to complete a material list including all measurements and grades of steel required to pre check and mark out to a specification for the fabrication of steel work. This will include metric and imperial units of measurement and materials.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing a set conditional material list and method statement • marking out steelwork components, such as end plates, cleats, bracket plates, cone templates, hopper templates or patterns of various dimension and orientation • identifying common engineering materials. <p>Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 305.1, 305.3, 305.5, 305.7.</p>		

Unit	Unit details		
306	Title: Preparation, joining and assembly of fabrication materials	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with preparing and using machines to cut and shape materials following drawings/data sheets used in the construction industry. Machines to be chip and non chip forming. Measurements to include imperial and metric dimensions.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • using guillotines, rolls, forming machines and flame cutting equipment • completing point of work/risk assessments • marking out steelwork components, possibly end plates, cleats, bracket plates, cone templates, hopper templates or patterns of various dimension and orientation, etc • using mechanical fasteners and thermal joining process. 		



Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 306.1, 306.3, 306.5.

Unit	Unit details		
307	Title: Forming of thick plate and sections	Graded: Pass/Merit/Distinction	Sample assessment: No
<p>Task Setting: Candidates will be tasked with preparing and using machines to form materials following drawings/data sheets used in the construction industry. Methods to include hand forming equipment, folding and bending equipment and bending rolls. Measurements to include imperial and metric dimensions.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • using guillotines, rolls and forming machines • completing point of work/risk assessments • producing folded, bent, cylindrical and conical shapes and simple transformer pieces. <p>Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. Dimensional accuracy can also be used as part of the grading criteria.</p> <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 307.1, 307.3, 307.5, 307.7.</p>			



Unit	Unit details		
308	Title: Prepare loads for moving, lifting and positioning	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with following given sketches/drawings to complete a material list including all measurements and grades of steel required to pre check and mark out to a specification for the moving of engineering construction loads. This would include metric and imperial units of measurement and materials.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing Point of Work/Risk Assessment/ Method Statement • identify forms of materials and their properties • establishing weights and preparing a load for moving, e.g. machinery, steelwork components, valves, etc. <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 308.1, 308.3, 308.4, 308.6.</p>		
	<p>Conditions 309.2.5 and 309.2.6 Candidates must be able to access engineering construction sites or a replicated environment.</p>		

Unit	Unit details		
309	Title: Move loads in engineering construction	Graded: Pass/Fail	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with preparing a Point of Work/Risk Assessment to lift loads in the engineering construction industry. A prepared lift plan must be followed at all times.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing point of work/risk assessment/ method statement • establishing weights, centres of gravity and irregular shapes for the moving of a load e.g. machinery ,steelwork components, valves, etc • selecting and attaching appropriate equipment • using varying methods of communication, e.g. radios, hand signals, verbal • moving the load over a designated route. <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate</p>		



	for Learning Outcomes 309.1, 309.3
	Conditions Lifting on external sites must comply with legal requirements, e.g. wind speeds, overhead cables and ground conditions.

Unit	Unit details		
310	Title: Lift and position loads in engineering construction	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with preparing a Point of Work/Risk Assessment to lift and position loads in the engineering construction industry. A prepared lift plan is to be followed at all times.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing Point of work/Risk Assessment/ Method Statement • establishing weights, centres of gravity and irregular shapes for the moving and positioning of a load, e.g. machinery ,steelwork components, valves, etc • selecting and attaching appropriate equipment • using varying methods of communication e.g. Radios, Hand Signals, Verbal • moving and position into a desired location the load over a designated route, e.g. into a Pre Fabricated Assembly Rig. <p>It is recommended that at least two forms of powered equipment and two forms of manual equipment to be covered.</p> <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 310.1, 310.3</p>		

Unit	Unit details		
311	Title: Interpret information and mark out pipework materials	Graded: Pass/Merit/Distinction	Sample assessment: Yes
	<p>Task Setting: Candidates will be tasked with following given sketches/drawings to complete a material list including all measurements and grades and will be required to pre check and mark out to a specification for pipe work. This would include metric and imperial units of measurement and materials.</p> <p>Appropriate tasks will include:</p>		



	<ul style="list-style-type: none"> • preparing a set conditional material list • marking out pipework and components, .e.g. templates, patterns, branches, “y” pieces and reducers. • developing patterns and templates. <p>Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 311.1, 311.3, 311.5, 311.7</p>
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Unit	Unit details		
312	Title: Preparation, fabrication and joining of pipework assemblies	Graded: Pass/Merit/Distinction	Sample assessment: Yes
	<p>Task Setting: Candidates will be tasked with interpreting drawings and sketches to produce a pipework assembly. Imperial and metric measurement to be used. Data sheets to be followed, if applicable. Materials to be used are specified in the range.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • completing a point of work/risk assessment/method statement • developing a material cutting list • developing, cutting and assembling a pipework assembly following a given drawing. <p>Sizes of pipework must be in accordance with pipework used in the engineering construction industry. It is recommended that short answer questions or professional discussion are used to assess knowledge of surface treatments and their applications.</p> <p>Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 312.1, 312.3, 312.5-312.9.</p>		



Unit	Unit details		
313	Title: Fabrication, installation and dismantling of pipework systems	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with producing, testing and dismantling a pipework assembly. Imperial and metric measurements to be used. Data sheets to be followed. Permit to Work and/or Risk Assessment/Method Statements to be followed. Additional guidance to be followed at all times.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • completion of a Point of Work/Risk Assessment • drawing and identifying a pipework system and safe shut down procedure • producing a pipework system • testing a pipework system • dismantling and supporting an existing pipework system. <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 313.1, 313.3, 313.5, 313.7.</p>		
<p>Conditions 313.6.7 and 313.8.4 can be carried out on a replicated system.</p>			

Unit	Unit details		
314	Title: Preparing for and inspecting fitting operations	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with identifying technical information by interpreting drawings, standards and other data types and listing applicable material types, specifications, codes and conventions.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • considering the impact of heat treatment on materials selected • listing the tools to be used • sketching isometric and oblique views of component parts, including tolerances and finishes • checking the calibration of measuring, inspection and marking out equipment • preparing materials for use, including measuring and marking out to prescribed tolerances . 		



	<p>Measurements could include bearings, pumps, valves, glands, etc.</p> <p>Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 314.1, 314.3, 314.5.</p>
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Unit	Unit details		
315	Title: Fitting by use of hand tools	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with identifying types of hand tools including files, drills, taps and dies and preparing materials through the use of hand tools.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • using devices to hold materials • preparing and restoring work areas • undertaking a point of work Assessment /risk assessment • obtaining Permits to Work and Method Statements • preparing materials through use of hand tools . <p>Tolerances, specifications and materials should be included in the sketches, measuring and marking out as they will assist with grading. In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 315.1, 315.3.</p>		

Unit	Unit details		
316	Title: Fitting by machining and assembling components	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Candidates will be tasked with identifying types of machine tools and will include lathes, milling machines, pedestal drills and pedestal grinders and fitting by machining and assembling components.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • interpreting drawings, job cards or other data types 		



	<ul style="list-style-type: none"> • using joining and locking systems • using work holding devices for machine operations • preparing and restoring work areas • undertaking a Point of Work/Risk Assessment • obtaining permit to work, method statement / job card • producing an operations sheet • preparing materials through use of machine tools • assembling mechanical components. <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 316.1, 316.3.</p>
	<p>Conditions 316.2.7 Shape has a limited number of surfaces, angles and dimensions to be achieved and not more than two different stages</p>

Unit	Unit details		
317	Title: Preparing and quality controlling the welding operation	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with identifying technical information by interpreting drawings, test certificates, quality standards and other data types and preparing and quality controlling the welding operation.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • using temperature indicating equipment for pre heating • setting up edge cutting equipment • using welding gauges • using quality assurance procedures and documents that apply to welding operations • undertaking post welding inspection. <p>Tasks could include preparing a pipe and / or a plate edge.</p> <p>Candidates must be able to describe the impact of quality assurance including ISO9001-2008, work instructions and welding procedure sheets (WPS). In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 317.1, 317.3.</p>		



Unit	Unit details		
318	Title: Welding with the manual metal-arc (MMA) process	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with selecting and setting manual metal-arc welding equipment, using a range of welding parameters, techniques and materials and positioning and securing work pieces.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing and restoring work areas • undertaking a risk or point of work assessment • obtaining a permit to work and method statement / job card • preparing materials from job specifications or welding procedure sheets • using a range of welding equipment <p>Tasks could include producing a Tee Fillet weld, Butt weld, Lap Joint, and Open corner joint</p> <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 318.1, 318.3, 318.5, 318.7</p>		

Unit	Unit details		
319	Title: Welding with the tungsten inert gas/tungsten arc gas (TIG/TAG) shielded process	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with selecting and setting welding tungsten inert gas/tungsten arc gas (TIG/TAG) shielded equipment, using a range of welding parameters, techniques and materials and positioning and securing work pieces.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing and restoring work areas • undertaking a risk or point of work assessment, obtaining a permit to work and method statement / job card • preparing materials from job specifications or welding procedure sheets • using a range of welding equipment <p>Tasks could include producing a Tee Fillet weld, Butt weld, Lap Joint, and Open corner joint</p> <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 319.1, 319.3, 319.5, 319.7</p>		



Unit	Unit details		
320	Title: Welding with the metal inert gas/metal active gas (MIG/MAG) process	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with selecting and setting metal inert gas/metal active gas (MIG/MAG) welding equipment, using a range of welding parameters, techniques and materials and positioning and securing work pieces.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing and restoring work areas • undertaking a risk or point of work assessment, obtaining a permit to work and method statement / job card • preparing materials from job specifications or welding procedure sheets • using a range of welding equipment <p>Tasks could include producing a Tee Fillet weld, Butt weld, Lap Joint, and Open corner joint</p> <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the candidate for Learning Outcomes 320.1, 320.3, 320.5, 320.7</p>		

Unit	Unit details		
321	Title: Welding with the flux cored arc welding (FCAW) process	Graded: Pass/Merit/Distinction	Sample assessment: No
	<p>Task Setting: Candidates will be tasked with selecting and setting flux cored arc welding (FCAW) process equipment, using a range of welding parameters, techniques and materials and positioning and securing work pieces.</p> <p>Appropriate tasks will include:</p> <ul style="list-style-type: none"> • preparing and restoring work areas • preparing materials from job specifications or welding procedure sheets • undertaking a risk or point of work assessment, obtaining a permit to work and method statement / job card • using a range of welding equipment <p>Tasks could include producing a Tee Fillet weld, Butt weld, Lap Joint, and Open corner joint</p> <p>In order to ensure all the knowledge requirements are covered, additional task/s may need to be set by the centre and completed by the</p>		



	candidate for Learning Outcomes 321.1, 321.3, 321.5, 321.7
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