ABC Awards

SEG Awards ABC Level 1 Certificate in Fabrication and Welding Practice

Qualification Guidance

Level 1 Certificate – 603/2239/1

About Us

At the Skills and Education SEG Awards (ABC)[1] we continually invest in high quality qualifications, assessments and services for our chosen sectors. As a UK leading sector specialist we continue to support employers and skills providers to enable individuals to achieve the skills and knowledge needed to raise professional standards across our sectors.

ABC has an on-line registration system to help customers register learners on its qualifications, units and exams. In addition it provides features to view exam results, invoices, mark sheets and other information about learners already registered.

The system is accessed via a web browser by connecting to our secure website using a username and password:
https://secure.ABCawards.co.uk/ors/secure_login.asp

Sources of Additional Information

The ABC website www.ABCawards.co.uk provides access to a wide variety of information.

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Specification Code, Date and Issue Number

The ABC Awards qualification code is C5702-01.
The date of this specification is 01 September 2017. The issue number is 2.

[1] ABC Awards is a brand of the Skills and Education Group Awards, a recognised awarding organisation and part of the Skills and Education Group. Any reference to ABC Awards, its registered address, company or charity number should be deemed to mean the Skills and Education Group Awards.

Contents

This is a live document and as such will be updated when required. It is the responsibility of the approved centre to ensure the most up-to-date version of the Qualification Guide is in use. Any amendments will be published on our website and centres are encouraged to check this site regularly.

Introduction

The new suite of ABC Awards qualifications in Fabrication and Welding Practice have been updated to include the latest fabrication and welding techniques, materials, processes and practices, and are assessed in line with industry demands, which include updated rigorous practical assessments as well as online on-demand multiple-choice question (MCQ) assessments.

The ABC Level 1 Certificate in Fabrication and Welding Practice has been developed in conjunction with academia and industry experts, to provide an introduction to Fabrication and Welding. The overall aim is to provide both experience and knowledge on which to base a future career and associated course decisions, and to enhance employment prospects.

The qualification offers a user-friendly method of continuous assessment and knowledge tests that encourage and enable those learners, previously unfamiliar with this area and level of training, to achieve a level of competence suitable for progression to further courses and into employment. It is also an ideal scheme for employers wishing to offer training for the purpose of specialist skills development.

Aims

The ABC Level 1 Certificate in Fabrication and Welding Practice aims to:

- provide basic knowledge and skills in order to enable the learner to handle materials, tools and equipment both safely and competently
- provide an introduction to the practical skills required in the fabrication and welding industry
- provide a basic introduction to various aspects of fabrication and welding work as a foundation for progression to further education and training
- improve job prospects
- develop core skills in the context of fabrication and welding
- widen access to vocational training.

Target Group

This qualification is designed for:

- school-age learners (14-16 year olds) who are looking for an introductory programme of a vocational type for progression into further education and/or employment
- 16–19 year olds in post-school education or training, particularly those with limited previous achievement, who wish to pursue a vocational course as a foundation to employment
- the mature learner who is seeking re-entry into the employment market, but who has insufficient qualifications and/or experience to compete for work
- those in employment in the engineering industry who need to acquire appropriate job-related qualifications.

ABC Awards expects approved centres to recruit with integrity on the basis of a learner's ability to contribute to and successfully complete all the requirements of a unit/s or the full qualification.

Content Overview

The ABC Level 1 Certificate in Fabrication and Welding Practice qualification covers the following four topics:

- **Unit 1 Health and Safety in an Industrial Environment** – in this unit learners will know about the requirements for carrying out safe working practices, including working with hand tools and powered machinery, emergency procedures, manual handling and current safety signage. Current legislation will also be covered.
- **Unit 2 Welding Processes (Manual Metal-Arc and Metal Active Gas)** – in this unit learners will know about the safe working practice and the correct procedures required when carrying out manual metal-arc and metal active gas welding activities. Learners will also be required to produce a welded joint.
- **Unit 3 Fabrication Processes (Sheet Metal and Plate)** – in this unit learners will know the methods of marking out, cutting and forming and the joining of materials, and working to tolerances. Safety requirements when carrying out fabrication practice will also be covered.

- **Unit 4 Engineering Drawing** – in this unit learners will use various drawing instruments and/or computer-aided design (CAD) systems to produce engineering drawings that will meet current industry standards.

Each individual unit is assessed through the completion of an assessment pack containing a task related to the specific unit. All four units are also assessed via a mandatory multiple choice knowledge test (examination) covering the whole qualification.

Progression Opportunities

Successful completion of the course provides a sound preparation for further vocational training, such as continuing onto ABC Level 2 Award and/or Certificate in Fabrication and Welding Practice.

Centres should be aware that reasonable adjustments which may be permitted for assessment may in some instances limit a learner's progression into the sector. Centres must, therefore, inform learners of any limits their learning difficulty may impose on future progression.

Resource Requirements

Centres must provide access to sufficient equipment in the centre or workplace to ensure candidates have the opportunity to cover all of the practical activities.

For external assessments the examination should be conducted at the Centre where the course delivery has taken place and should be carried out in accordance with the examination requirements of ABC Awards.

Tutor/Assessor Requirements

We require those involved in the assessment process to be suitably experienced and / or qualified. In general terms, this usually means that the assessor is knowledgeable of the subject / occupational area to a level above that which they are assessing.

Assessors should also be trained and qualified to assess or be working towards appropriate qualifications.

Language

These specifications and associated assessment materials are in English only.

Qualification Summary

Qualification and Pathways ABC Level 1 Certificate in Fabrication and Welding Practice	
Qualification Number	603/2239/1
Regulated	The qualification, identified above, is regulated by Ofqual.
Assessment	Internal assessment, internal and external moderation. External assessment (MCQ exam)
Grading	Pass
Operational Start Date	01/09/2017
Ofqual Review Date	01/09/2020
ABC Sector	Engineering
Ofqual SSA Sector	4.1 Engineering
Contact	See the ABC Awards website for Centre Support Officer responsible for this qualification.

ABC Level 1 Certificate in Fabrication and Welding Practice

Rules of Combination:
Learners must complete all 4 mandatory units to achieve the qualification.

Units	Unit Number	Level	Credit Value	GLH
1. Health and Safety in an Industrial Environment	K/616/1262	1	5	50
2. Welding Processes (Manual Metal-Arc and Metal Active Gas)	M/616/1263	1	5	50
3. Fabrication Processes (Sheet Metal and Plate)	T/616/1264	1	5	50
4. Engineering Drawing	A/616/1265	1	5	50

Qualification Purpose	B. Prepare for further learning or training and/or develop knowledge and/or skills in a subject area. B2. Develop knowledge and/or skills in a subject area.							
Entry Requirements	There are no formal pre-requisites for entry onto this scheme. Each centre is required to notify the awarding body of its policies on access and equality of opportunity. Within the parameters of these policies, a centre is expected to recruit with integrity on the basis of a learner's ability to contribute to and successfully complete the qualification.							
Age Range	Pre 16	✓	16 - 18	✓	18+	✓	19+	✓
Recommended GLH	200							
Recommended TQT	200							
Credit Value	20							
Learning Aims Reference	See Learning Aim Reference Service (LARS) website: https://data.gov.uk/dataset/learning-aim-reference-service							

Type of Funding Available	See Learning Aim Reference Service (LARS) website
Qualification Fee / Unit Fee	See ABC website for current fees and charges.
Additional Information	See ABC website for resources available for this qualification. N.B. The equipment that 14-16 year old learners are able to use is governed by the current health and safety regulations. Tutors will need to be aware of this, and adapt learning programmes accordingly. 14-16 year old learners may have to learn through observation rather than practical experience where they cannot use specific equipment.

Unit Details

1. Health and Safety in an Industrial Environment

Unit Reference	K/616/1262
Level	1
Credit Value	5
Guided Learning Hours	50
Unit Summary	The learner will know about the requirements for health and safety within an industrial environment. Current legislation will be covered as will the requirements for carrying out safe working practices to include working with hand tools and powered machinery, emergency procedures, manual handling and current safety signage.

Learning Outcomes **The learner will:**	**Assessment Criteria** **The learner can:**
1. Understand Health and Safety Legislation	1.1. Identify the basic responsibilities of: • the employer • the employee with regards to Health and Safety at Work Act etc. 1974 1.2. Identify the use of legislation and regulations, to include: • Control of Substances Hazardous to Health (COSHH) • Provision and use of Work Equipment Regulations (PUWER)
2. Know about dangers in the workplace	2.1. Identify dangers in the workplace, to include: • using hand tools • using powered machinery • safe use of welding equipment • working with electricity 2.2. Identify the difference between: • a hazard • a risk

	2.3. State the purpose of using a risk assessment 2.4. Use an appropriate pro-forma to complete a risk assessment 2.5. State the procedure to follow in the event of an accident
3. Understand emergency procedures in the workplace	3.1. Identify the main causes of fire 3.2. Identify the procedure to following the event of a fire 3.3. Identify the colour coding system applied to fire extinguishers 3.4. Identify the four main groups of safety signs 3.5. Identify the importance of First Aid facilities in the workplace
4. Understand safe practices when handling and lifting by manual methods	4.1. Identify correct methods of handling and lifting using manual techniques 4.2. Identify aids for manual lifting
5. Know about the use of personal protective equipment (PPE)	5.1. State the purpose of using PPE in the workplace 5.2. Identify items of PPE as used in the workplace

Supporting Unit Information

Health and Safety in an Industrial Environment – K/616/1262 – Level 1

Indicative Content

Note: Indicative content provides an indication of the scope for the Learning Outcomes and Assessment Criteria. It is intended as a resource to help guide the delivery and assessment of the unit. Indicative content is NOT a statement of material which must be covered and evidenced for assessment.

Learning Outcome 1 Understand Health and Safety Legislation

1.1 Employer responsibilities

- Safeguard, as far as is possible, the health, safety, security and welfare of all those that work for them.
- Ensure all machinery is used safely and equipment provided must be maintained to make sure that it is safe to use.
- Ensure that employees are trained to use both machinery and equipment correctly; this includes tools and Personal Protective Equipment (PPE).

Employee responsibilities

- Take reasonable care to avoid harming themselves.
- Co-operate with employers to meet all relevant legislation.
- Not interfere with or misuse anything provided that protects their health, safety, security or welfare.

1.2 Control of Substances Hazardous to Health (COSHH)

Prevent or reduce workers exposure to hazardous substances by:

- finding out what the health hazards are
- deciding how to prevent harm to health (risk assessment)
- providing control measures to reduce harm to health
- making sure the control measures are used
- keeping all control measures in good working order
- providing information, instruction and training for employees and others
- providing monitoring and health surveillance in appropriate cases
- planning for emergencies.

Provision and Use of Work Equipment Regulations (PUWER)
PUWER requires that equipment provided for use at work is:

- suitable for the intended use
- safe for use, maintained in a safe condition and inspected to ensure it is correctly installed and does not subsequently deteriorate
- used only by people who have received adequate information, instruction and training
- accompanied by suitable health and safety measures, such as protective devices and controls. These will normally include emergency stop devices, adequate means of isolation from sources of energy, clearly visible markings and warning devices
- used in accordance with specific requirements, for mobile work equipment and power presses.

Learning Outcome 2. Know about dangers in the workplace

2.1 Consider how to avoid physical risks, chemical risks, and general risks, e.g. using specialised lifting equipment, maintaining tidy work area, appropriate warning signs in place, following instructions regarding the use of equipment/consumables, adequate ventilation, proper storage etc.

General risks, e.g. moving machinery, falling objects, untidy work areas, manual handling of tools, materials, equipment and consumables

Physical risks, e.g. electricity, heat, flames, fire, explosion, noise etc.

Chemical risks, e.g. fumes, fuel gases, gas mixtures, solvents etc.

2.2 Potential hazards in a workshop environment.

Hazards being anything that could potentially cause harm.

Risk being the likelihood that the hazard could cause harm, rated as high/medium/low.

2.3 Consider the five steps to a risk assessment:

- Identify hazards (walk round, talk to people, check accident records)

- Decide who might be harmed (think who is in the workplace, any special needs of staff etc)
- Evaluate risks and decide on precautions (can the risk be removed, if not how to reduce risk).
- Record findings and implement them (think of recommendations in terms of immediate actions/short medium and long term. Also think about clear responsibilities and timescales for checks).
- Review assessment and update if necessary (think of review schedule, how the work environment has changed).

2.4 Undertake a risk assessment with an appropriate proforma.

2.5 Know about accident and emergency procedures. Learners will need to find out what their organisation's accident and emergency procedures are and relate what has to be done in the event of injury to self or others, fire, malfunctions of equipment and problems with hazardous substances.

Learning Outcome 3 Understand emergency procedures in the workplace

3.1 Identify the main causes of fire needing a source of ignition (heat), a source of fuel (something that burns) and oxygen. Sources of ignition include heaters, lighting, naked flames, electrical equipment, and anything else that can get very hot or cause sparks. Sources of fuel include wood, paper, plastic, rubber or foam, loose packaging materials and waste rubbish. Sources of oxygen include the air around us.

3.2 Identify the procedure to follow in the event of a fire. On discovering a fire, raise the alarm to alert anyone in the immediate vicinity, activate the nearest push-glass fire alarm call-point (small red box, close to major exits). If safe to do so, use an appropriate fire extinguisher to tackle the fire, but only if your exit is clear. Leave the building by the nearest exit.

3.3 Identify the colour coding system applied to fire extinguishers. Reference to all new fire extinguishers in the EU painted in signal red, and the important colour coding is on their labels. Water fire extinguishers for use on Class A fires only. Foam Fire Extinguishers with a cream panel suitable for use on Class A and Class B fires. Dry powder fire extinguishers with a blue panel are suitable for use on

Class A, B or C fires. Carbon Dioxide Fire Extinguishers with a black panel are suitable for use on Class B fires and those involving electrical equipment.

3.4 Identify the four main groups of safety signs

- Mandatory – main colour blue with symbol or text in white.
- Warning – main colour yellow with black symbol or text.
- Safe condition/escape route – main colour green with white symbol or text.
- Prohibited – main colour red with white background red band and crossbar.

3.5 Identify the importance of First Aid facilities in the workplace

The Health and Safety (First-Aid) Regulations 1981 require provision of adequate and appropriate first-aid equipment, facilities and people so that employees can be given immediate help if they are injured or taken ill at work. What is 'adequate and appropriate' will depend on the circumstances in the workplace and assessment should take place of what first-aid needs are. The minimum first-aid provision on any work site is a suitably stocked first-aid kit, an appointed person to take charge of first-aid arrangements and information for employees about first-aid arrangements.

Learning Outcome 4 Understand safe practices when handling and lifting by manual methods

4.1 Identify correct methods of handling and lifting using manual techniques.

Compliance with the risk assessment requirements set out in the Management of Health and Safety at Work Regulations 1999 as well as the requirement in the Manual Handling Operations Regulations 1992 (MHOR) to carry out a risk assessment on manual handling tasks.

As an employee:

- Make full use of any safe system of manual handling the employer puts in place.
- Avoid hazardous manual handling operations so far as is reasonably practicable.
- Assess any hazardous manual handling operations that cannot be avoided.

- Reduce the risk of injury so far as is reasonably practicable.
- Review assessments if they become out of date or if the tasks they refer to change.
- Follow appropriate systems of work laid down for their safety.
- Make proper use of equipment provided for their safety.
- Co-operate with their employer on health and safety matters.
- Take care to ensure that their activities do not put others at risk.
- Consider the moving of items either by lifting, lowering, carrying, pushing or pulling.
- Identify important factors such as the weight of the item, the number of times required to pick up or carry an item, the distance to be carried, where you are picking it up from or putting it down (picking it up from the floor, putting it on a shelf above shoulder level) and any twisting, bending, stretching or other awkward posture you may adopt while undertaking a task.
- Remove obstructions from the route, for a long lift, plan to rest the load midway on a table or bench to change grip, keep the load close to the waist.
- The load should be kept close to the body for as long as possible while lifting, keep the heaviest side of the load next to the body and adopt a stable position, feet apart, with one leg slightly forward to maintain balance.

4.2 Identify aids for manual lifting in the work environment.

Consider the type of lift required and route to be followed. Use of skates, harnesses, rollers, pinch bar, material positioners etc.

Learning Outcome 5 Know about the use of personal protective equipment (PPE)

5.1. State the purpose of using PPE in the workplace.
Look at machinery in the work shop and identify guards, screens etc. locate fire extinguishers, emergency switches and exits in the work environment. These tasks could be completed on a workshop plan or through the use of photographs.

Identify waste materials e.g. chemicals, gas exhausts, greases, fluids etc. should be dealt with to comply with current laws and regulations.

5.2 Identify items of PPE as used in the workplace.

PPE is to be worn to protect against potential hazards. PPE is equipment that will protect the user against health or safety risks at work. It can include items such as safety helmets, gloves, eye protection, high-visibility clothing, safety footwear and safety harnesses. It also includes respiratory protective equipment.

Teaching Strategies and Learning Activities

This comprehensive Health and Safety in an Industrial Environment unit supports all units within this qualification.

Reference needs to be applied in all units as appropriate. It is essential that learners complete this unit before any other units are undertaken, and that Health and Safety is reinforced within all practical units.

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified specific needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning should be delivered through a combination of learner-centred classroom sessions, workshop practice and individual guided learning. The emphasis is on practical learning opportunities and individual action plans. The prospective learning group is likely to require a good deal of tutor support in achieving the planned outcomes.

It is suggested that a simulated working atmosphere/environment should be adopted. In addition, learners should be provided with real work experiences wherever possible and visits to places of interest and co-operation with local engineering establishments are strongly recommended.

Delivery may be enhanced by:

- liaising with employers with reference to delivery, work experience and/or resources
- visits to appropriate places of interest
- the provision of information and guidance to learners on the availability and type of employment the qualification may lead to and on the progression routes available for further education and training.

N.B. The equipment that 14-16 year old learners are able to use is governed by the current health and safety regulations. Tutors will need to be aware of this, and adapt learning programmes accordingly. 14-16 year old learners may have to learn through observation rather than practical experience where they cannot use specific equipment.

Methods of Assessment

This unit will be:

- internally assessed and internally and externally moderated through completion of an assessment pack; and
- externally assessed through the completion of a mandatory multiple-choice knowledge test (examination).

Evidence of Achievement

The assessment pack for this unit is available to registered centres. The pack details the assessed task, documentation to be completed by the learner, details of the task, assessment criteria and grade awarded. Learners must pass all tasks in order to demonstrate achievement of this unit.

The knowledge test consists of 30 multiple-choice type questions to be completed in 1 hour, and is a mandatory requirement for all learners undertaking this qualification. In order to achieve a pass grade a minimum mark of 60% will be required (18 / 30). The grade recorded will be pass/fail only. The test covers the entire qualification and is split into the following questions:

Breakdown of number of questions for each unit	**Number of questions**
Unit 1. Health and Safety in an Industrial Environment	10
Unit 2. Welding Processes (Manual Metal-Arc and Metal Active Gas)	7
Unit 3. Fabrication Processes (Sheet Metal and Plate)	7
Unit 4. Engineering Drawing	6
Total questions	30

The knowledge test should be conducted at the Centre where the course delivery has taken place. The knowledge test for this qualification should be carried out in accordance with the knowledge test requirements of ABC Awards.

It is required that an independent invigilator should oversee the knowledge test and that course tutors/assessors should not have access to the knowledge test room before, during or after the examination.

ABC Awards reserve the right to attend examinations to undertake an audit of the centre's procedures relating to compliance with these invigilation instructions.

Additional Information

Additional guidance for delivering and assessing ABC Awards qualifications and information about Internal Quality Assurance is available on the ABC Awards web site.

2. Welding Processes (Manual Metal-Arc and Metal Active Gas)

Unit Reference	M/616/1263
Level	1
Credit Value	5
Guided Learning Hours	50
Unit Summary	Learners will know about the safe working practice and the correct procedures required when carrying out manual metal-arc (MMA) and metal active gas (MAG) welding activities. It will also be required for the learner to produce a welded joint to an acceptable standard.

Learning Outcomes The learner will:	**Assessment Criteria The learner can:**
1. Know about the dangers associated with MMA and MAG welding activities	1.1. State the importance of wearing the correct personal protective equipment (PPE) when carrying out welding activities 1.2. Identify the dangers of MMA and MAG welding, to include: • inhalation of welding fumes • hot metal • arc radiation burns • arc eye • electric shocks
2. Know about the equipment used for welding	2.1. Identify parts of the equipment used for MMA and MAG welding: MMA welding equipment, to include: • power supply (transformer/rectifier) • welding lead • welding return lead • electrode holder MAG welding equipment, to include: • power supply (rectifier) • cylinder and regulator

	• electrode wire and wire drive mechanism • welding torch, to include contact tip and shroud • welding return lead
3. Know how to prepare equipment and materials for welding	3.1. Identify the safe procedure for assembling the equipment prior to welding activities 3.2. Identify safety checks to be carried out to ensure the equipment is safe to use 3.3. Identify the correct parameters required for the welding activity, to include: MMA welding • current • slope and tilt angles • arc length MAG welding • current/voltage • wire speed • shielding gas flow rate • slope and tilt angles 3.4. Identify how to select and store the consumables to be used for the welding activity 3.5. Describe how the material should be prepared prior to welding
4. Be able to produce welded joints	4.1. Describe and demonstrate the procedure for producing a welded joint by one of the listed welded processes: • MMA • MAG 4.2. Produce one of the listed welded joints in low carbon steel thickness range from 3 mm to 6 mm. Welds to be completed in the flat (PA) or horizontal vertical (PB) welding positions: • 90° open corner joint • lap joint
5. Know about the quality of completed welds	5.1. Undertake visual inspection of the completed welded joint to determine the presence of welding defects, to include: • undercut

	• porosity • uneven weld profile • lack of/or excessive root penetration (open corner joint) • absence of surface marks

Supporting Unit Information

Welding Processes (Manual Metal-Arc and Metal Active Gas) – M/616/1263 – Level 1

Indicative Content

Note: Indicative content provides an indication of the scope for the Learning Outcomes and Assessment Criteria. It is intended as a resource to help guide the delivery and assessment of the unit. Indicative content is NOT a statement of material which must be covered and evidenced for assessment.

The Indicative Content for this unit is self-explanatory from the Assessment Criteria listed.

It is important that learners gain a knowledge and understanding of

- the parts of a MMA or MAG welding system
- the safe procedure for assembling the equipment prior to welding activities and the safety checks to be carried out to ensure the equipment is safe to use
- the selections and storage of welding consumables
- the preparation of plate prior to welding
- the selection of MMA or MAG welding parameters
- MMA or MAG weld procedures and MMA or MAG weld defects.

Teaching Strategies and Learning Activities

Refer to Teaching Strategies and Learning Activities for Unit 1.

Methods of Assessment

Refer to Methods of Assessment for Unit 1.

Evidence of Achievement

Refer to Evidence of Achievement for Unit 1.

Additional Information

Refer to Additional Information for Unit 1.

3. Fabrication Processes (Sheet Metal and Plate)

Unit Reference	T/616/1264
Level	1
Credit Value	5
Guided Learning Hours	50
Unit Summary	Learners will know the methods of marking out, cutting and forming and the joining of materials, which are part of an end practical assessment. Working to tolerances as shown on engineering drawings is an integral part of this unit. Learners will know the safety requirements when carrying out fabrication practice.

Learning Outcomes The learner will:	**Assessment Criteria The learner can:**
1. Know about the safe working practices when carrying out fabrication activities	1.1. State the importance of wearing the correct PPE when carrying out fabrication activities 1.2. Identify the dangers when working on fabrication activities, to include: • handling and lifting materials • using hand tools • using cutting and forming equipment and machines 1.3. Identify guards that are used on machines, to include: • fixed guards • movable guards • light guards
2. Know about forms of supply that is used in fabrication	2.1. Identify forms of supply used in fabrication activities, to include: • tin plate • sheet • plate • equal and unequal angle section • rolled steel channel • pipe and tube

	2.2. Identify the precautions to be taken when storing materials for fabrication activities
3. Understand the principles of marking out	3.1. Identify tools and instruments used to mark out both sheet metal and plate sections, to include: • scriber and chalk lines • rules and tapes • straight edges • dividers • trammels • squares and protractors • callipers • punches 3.2. Identify methods of marking out sheet metal and plate sections 3.3. Use marking out equipment to mark out components to dimensions and tolerances
4. Know about fabrication equipment	4.1. Identify hand tools, manual and powered machines for cutting materials, to include: • hacksaws • tin snips • bench shears • guillotine 4.2. Identify hand tools, manual and powered machines for forming materials, to include: • folding bars • folding machines • rolling machines (pyramid and pinch) 4.3. Identify powered drilling machines, to include: • bench drill • pillar drill
5. Be able to produce fabricated assemblies	5.1. Identify methods of joining sheet metal and plate, to include: • self-secured joints • hollow rivets • welding • mechanical fasteners 5.2. Identify bending sequences as applied to sheet metal assemblies

	5.3. Identify the effects of springback as applied to bending and rolling 5.4. Produce a fabricated assembly from information given on a drawing to a stated tolerance 5.5. Identify methods of inspection and quality control as applied to fabricated assemblies

Supporting Unit Information

Fabrication Processes (Sheet Metal and Plate) – T/616/1264 – Level 1

Indicative Content

Note: Indicative content provides an indication of the scope for the Learning Outcomes and Assessment Criteria. It is intended as a resource to help guide the delivery and assessment of the unit. Indicative content is NOT a statement of material which must be covered and evidenced for assessment.

Learning Outcome 1 Know about the safe working practices when carrying out fabrication activities

1.1 State the importance of wearing the correct PPE when carrying out fabrication activities such as flame proof overalls, safety footwear, safety spectacles, goggles and gloves or gauntlets.

1.2 Identify the dangers when working on fabrication activities, to cover handling and lifting materials with the risks of slips, trips, falls, trapping, crushing and other possible physical injury. Safe use of hand tools with regards correct selection and appropriate use. Safe use of cutting and forming equipment and machines with regards to training, supervision and safe working procedures.

1.3 Identify guards that are used on machines to cover fixed guards which require tooling to remove them and movable guards that can be adjusted to suit the operation required and light guards that prevent operation when the beam is crossed.

Learning Outcome 2 Know about forms of supply that is used in fabrication

2.1 Identify forms of supply used in fabrication activities, to include:

- Tin plate
- Sheet
- Plate
- Equal and unequal angle section
- Rolled steel channel
- Pipe and tube.

2.2 Identify the precautions to be taken when storing materials for fabrication activities with regards to types of materials, racks, environmental conditions, access and egress.

Learning Outcome 3 Understand the principles of marking out

3.1 Identify tools and instruments used to mark out both sheet metal and plate sections, to include:

- Scriber and chalk lines
- Rules and tapes
- Straight edges
- Dividers
- Trammels
- Squares and protractors
- Callipers
- Punches.

3.2 Identify methods of marking out sheet metal and plate sections using marking blue, marker pens, chalk, chalk line and scribe marks.

3.3 Use marking out equipment to mark out components to dimensions and tolerances using adjustable squares, set squares, rules, tapes, dividers, plate protractors, hammers, centre punches and scribers.

Learning Outcome 4 Know about fabrication equipment

4.1 Identify hand tools, manual and powered machines for cutting materials, to include:

- Hacksaws
- Tin snips
- Bench shears
- Guillotine.

4.2 Identify hand tools, manual and powered machines for forming materials, to include:

- Folding bars
- Folding machines
- Rolling machines (pyramid and pinch).

4.3 Identify powered drilling machines, to include:

- Bench drill
- Pillar drill.

Learning Outcome 5 Be able to produce fabricated assemblies

5.1 Identify methods of joining sheet metal and plate, to include:

- Self-secured joints
- 'Pop' rivets
- Welding
- Mechanical fasteners (self-tapping screws, bolts, nuts, washers).

5.2 Identify bending sequences as applied to sheet metal assemblies.

5.3 Identify the effects of springback as applied to bending and rolling.

5.4 Produce a fabricated assembly from information given on a drawing to a stated tolerance.

5.5 Identify methods of inspection and quality control as applied to fabricated assemblies.

Teaching Strategies and Learning Activities

Refer to Teaching Strategies and Learning Activities for Unit 1.

Methods of Assessment

Refer to Methods of Assessment for Unit 1.

Evidence of Achievement

Refer to Evidence of Achievement for Unit 1.

Additional Information

Refer to Additional Information for Unit 1.

4. Engineering Drawing

Unit Reference	A/616/1265
Level	1
Credit Value	5
Guided Learning Hours	50
Unit Summary	Using various drawing instruments and/or computer-aided design (CAD) systems, learners will know how to produce engineering drawings that will meet current industry standards.

Learning Outcomes The learner will:	**Assessment Criteria The learner can:**
1. Know about the presentation of engineering drawings	1.1. Identify the use of orthographic drawings, to include: • first angle projection • third angle projection 1.2. Identify other forms of graphic representation, to include: • isometric drawings • oblique drawings 1.3. Identify information shown on a drawing, to include: • dimensioning (to current engineering standards) • scale • line types • title box information 1.4. Identify drawing paper sizes (A2, A3, A4)
2. Know about engineering drawings and symbols	2.1. Identify first and third angle projection symbols 2.2. Identify welding symbols for fillet and butt welds 2.3. Identify symbols and conventions, to include:

	• diameter • square • radii • measurement units
3. Be able to use manual drafting methods	3.1. Use manual drafting methods to produce: • angles of 30^{o}, 45^{o}, 60^{o} and 90^{o} • a regular hexagon • an ellipse 3.2. Divide a line into 5 equal parts
4. Be able to produce engineering drawings	4.1. Using CAD or manual drawing methods, produce a drawing of an engineering component. The completed drawing should be: • drawn in first or third angle projection • fully dimensioned • drawn to scale • showing a title box 4.2. Identify the advantages and limitations of using a CAD system for producing engineering drawings

Supporting Unit Information

Engineering Drawing – A/616/1265 – Level 1

Indicative Content

Note: Indicative content provides an indication of the scope for the Learning Outcomes and Assessment Criteria. It is intended as a resource to help guide the delivery and assessment of the unit. Indicative content is NOT a statement of material which must be covered and evidenced for assessment.

The Indicative Content for this unit is self-explanatory from the Assessment Criteria listed.

It is important that learners gain a knowledge and understanding of:

- basic drawing techniques including manual and/or computer aided techniques
- drawing aids used to produce drawings
- information and symbols applied to drawings
- various orthographic projection methods
- details of information boxes on workshop drawings
- engineering drawing conventions and symbols
- advantages and limitations of using a CAD system for producing engineering drawings.

For **Learning Outcome 4**, learners are required to use appropriate techniques to produce simple engineering drawings. This is a Level 1 unit and therefore the tasks set to demonstrate this skill should be at an appropriate level, but need to contain all the required elements for the drawing. It might be useful for learners to produce both a manual example and a computer generated example.

Teaching Strategies and Learning Activities

Refer to Teaching Strategies and Learning Activities for Unit 1.

Methods of Assessment

Refer to Methods of Assessment for Unit 1.

Evidence of Achievement

Refer to Evidence of Achievement for Unit 1.

Additional Information

Refer to Additional Information for Unit 1.

Appendices

Recognition of Prior Learning, Exemption and Credit Transfer

ABC Awards policy enables learners to avoid duplication of learning and assessment in a number of ways:

- Recognition of Prior Learning (RPL) – a method of assessment that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and do not need to develop through a course of learning.
- Exemption - Exemption applies to any certificated achievement which is deemed to be of equivalent value to a unit within ABC qualification but which does not necessarily share the exact learning outcomes and assessment criteria. It is the assessor's responsibility, in conjunction with the Internal Moderator, to map this previous achievement against the assessment requirements of the ABC qualification to be achieved in order to determine its equivalence. Any queries about the relevance of any certificated evidence, should be referred in the first instance to your centre's internal moderator and then to ABC.
  It is important to note that there may be restrictions upon a learner's ability to claim exemption or credit transfer which will be dependent upon the currency of the unit/qualification and a learner's existing levels of skill or knowledge.
  Where past certification only provides evidence that could be considered for exemption of part of a unit, learners must be able to offer additional evidence of previous or recent learning to supplement their evidence of achievement.
- Credit Transfer – ABC may attach credit to a qualification, a unit or a component. Credit transfer is the process of using certificated credits achieved in one qualification and transferring that achievement as a valid contribution to the award of another qualification. Units / Components transferred must share the same learning outcomes and assessment criteria along with the same unit number. Assessors must ensure that they review and verify the evidence through sight of:
  - original certificates OR
  - copies of certificates that have been signed and dated by the internal moderator confirming the photocopy is a real copy

and make these available for scrutiny by the External Moderator.

- Equivalencies – opportunities to count credits from the unit(s) from other qualifications or from unit(s) submitted by other recognised organisations towards the place of mandatory or optional unit(s) specified in the rule of combination. The unit must have the same credit value or greater than the unit(s) in question and be at the same level or higher.

ABC encourages its centres to recognise the previous achievements of learners through RPL, Exemption and Credit Transfer. Prior achievements may have resulted from past or present employment, previous study or voluntary activities.

Centres should provide advice and guidance to the learner on what is appropriate evidence and present that evidence to the external moderator in the usual way.

Further guidance can be found in 'Delivering and Assessing ABC Qualifications' which can be downloaded from http://www.abcawards.co.uk/centres-2/policies-procedures/

Certification

ABC Awards' policies and procedures for claiming certification are available on the web site.

Glossary of Terms

Guided Learning Hours (GLH)
GLH is where the learner participates in education or training under the immediate guidance or supervision of a tutor (or other appropriate provider of education or training). It may be helpful to think – 'Would I need to plan for a member of staff to be present to give guidance or supervision?'

GLH is calculated at the unit/component level and added up at the qualification level.

Examples of guided learning include:

- Face-to-face meeting with a tutor
- Telephone conversation with a tutor
- Instant messaging with a tutor
- Taking part in a live webinar
- Classroom-based instruction
- Supervised work
- Taking part in a supervised or invigilated assessment
- The learner is being observed.

TQT (Total Qualification Time)

'The number of notional hours which represents an estimate of the total amount of time that could reasonably be expected to be required, in order for a learner to achieve and demonstrate the achievement of the level of attainment necessary for the award of a qualification.' The size of a qualification is determined by the TQT.

TQT is made up of the GLH plus all other time taken in preparation, study or any other form of participation in education or training but not under the direct supervision of a lecturer, supervisor or tutor.

TQT is calculated at qualification level and not unit/component level.

Examples of unsupervised activities that could contribute to TQT include:

- Researching a topic and writing a report
- Watching an instructional online video at home/e-learning
- Watching a recorded webinar
- Compiling a portfolio in preparation for assessment
- Completing an unsupervised practical activity or work
- Rehearsing a presentation away from the classroom
- Practising skills unsupervised
- Requesting guidance via email – will not guarantee an immediate response.