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Specification

BTEC Specialist qualifications

Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)

For first teaching November 2011

A PEARSON COMPANY

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BTEC Specialist qualification title covered by this specification

Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)

This qualification has been accredited to the Qualifications and Credit Framework (QCF) and is eligible for public funding as determined by the Department for Education (DfE) under Section 96 of the Learning and Skills Act 2000.

The qualification title listed above features in the funding lists published annually by the DfE and the regularly updated website www.education.gov.uk. The QCF Qualification Number (QN) should be used by centres when they wish to seek public funding for their learners. Each unit within a qualification will also have a QCF unit code.

The QCF qualification and unit codes will appear on learners' final certification documentation.

The Qualification Number for the qualification in this publication is:

Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)	600/3490/7

This qualification title will appear on learners' certificates. Learners need to be made aware of this when they are recruited by the centre and registered with Edexcel.

This qualification is accredited by Ofqual as being part of the Apprenticeship Framework in Construction (Civil Engineering).

Welcome to BTEC Level 2 Specialist qualifications

We are delighted to introduce our qualification, which will be available for teaching from September 2010. This qualification has been revised and conforms with the requirements of the new QCF (Qualifications and Credit Framework).

Focusing on the Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)

The Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF) is designed to develop the skills and knowledge of learners in the plant maintenance (construction) industry. It has been specifically developed for delivery in a training environment using simulated conditions. The qualification provides a progression route towards achieving a competence qualification (NVQ) and is a component of the Apprenticeship Framework: FR00814 Construction (Civil Engineering).

Straightforward to implement, teach and assess

Implementing BTECs couldn't be easier. They are designed to fit easily into your curriculum and can be studied independently or alongside existing qualifications, to suit the interests and aspirations of learners. The clarity of assessment makes grading learner attainment simple.

Engaging for everyone

Learners of all abilities flourish when they can apply their own knowledge, skills and enthusiasm to a subject. BTEC qualifications make explicit the link between theoretical learning and the world of work by giving learners the opportunity to apply their research, skills and knowledge to work-related contexts and case studies. These applied and practical BTEC approaches give all learners the impetus they need to achieve and the skills they require for workplace or education progression.

Recognition

BTECs are understood and recognised by a large number of organisations in a wide range of sectors. BTEC qualifications are developed with key industry representatives and Sector Skills Councils (SSC) to ensure that they meet employer and learner needs — **in this case ConstructionSkills is the SSC**.

All you need to get started

To help you off to a flying start, we've developed an enhanced specification that gives you all the information you need to start teaching BTEC. This includes:

- a framework of equivalencies, so you can see how this qualification compares with other Edexcel vocational qualifications
- information on rules of combination, structures and quality assurance, so you can deliver the qualification with confidence
- explanations of the content's relationship with the learning outcomes
- guidance on assessment, and what the learner must produce to achieve the unit.

Don't forget that we're always here to offer curriculum and qualification updates, local training and network opportunities, advice, guidance and support.

Contents

What are BTEC Level 2 Specialist qualifications?

BTEC Specialist qualifications are qualifications at Entry level to level 3 in the Qualifications and Credit Framework (QCF) and are designed to provide specialist work-related qualifications in a range of sectors. They give learners the knowledge, understanding and skills that they need to prepare for employment. The qualifications also provide career development opportunities for those already in work. Consequently they provide a course of study for full-time or part-time learners in schools, colleges and training centres.

BTEC Specialist qualifications provide much of the underpinning knowledge and understanding for the National Occupational Standards for the sector, where these are appropriate. They are supported by the relevant Standards Setting Body (SSB) or Sector Skills Council (SSC). A number of BTEC Specialist qualifications are recognised as the knowledge components of Apprenticeships Frameworks. They attract achievement and attainment table points that equate to similar-sized general qualifications. On successful completion of a BTEC Specialist qualification, learners can progress to or within employment and/or continue their study in the same, or related vocational area.

The QCF is a framework which awards credit for qualifications and units and aims to present qualifications in a way that is easy to understand and measure. It enables learners to gain qualifications at their own pace along flexible routes.

There are three sizes of qualification in the QCF:

- Award (1 to 12 credits)
- Certificate (13 to 36 credits)
- Diploma (37 credits and above).

Every unit and qualification in the framework will have a credit value.

The credit value of a unit specifies the number of credits that will be awarded to a learner who has achieved the learning outcomes of the unit.

The credit value of a unit is based on:

- one credit for those learning outcomes achievable in 10 hours of learning
- learning time – defined as the time taken by learners at the level of the unit, on average, to complete the learning outcomes of the unit to the standard determined by the assessment criteria.

The credit value of the unit will remain constant in all contexts, regardless of the assessment method used for the qualification(s) to which it contributes.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Edexcel BTEC Level 2 Award

The Edexcel BTEC Level 2 Award provides an introduction to the skills, qualities and knowledge that may be required for employment in a particular vocational sector.

Edexcel BTEC Level 2 Certificate

The Edexcel BTEC Level 2 Certificate extends the work-related focus from the Edexcel BTEC Level 2 Award (QCF) and covers some of the knowledge and practical skills required for a particular vocational sector.

The Edexcel BTEC Level 2 Certificate offers an engaging programme for those who are clear about the vocational area they want to learn more about. These learners may wish to extend their programme through the study of a related GCSE, a complementary NVQ or other related vocational or personal and social development qualification. These learning programmes can be developed to allow learners to study complementary qualifications without duplication of content.

For adult learners the Edexcel BTEC Level 2 Certificate can extend their knowledge and understanding of work in a particular sector. It is a suitable qualification for those wishing to change career or move into a particular area of employment following a career break.

Edexcel BTEC Level 2 Diploma

The Edexcel BTEC Level 2 Diploma extends the work-related focus from the Edexcel BTEC Level 2 Certificate. There is potential for the qualification to prepare learners for employment in a particular vocational sector and it is suitable for those who have decided that they wish to enter a specific area of work.

Key features of the Edexcel BTEC Level 2 Diploma in Plant Maintenance

The Edexcel BTEC Level 2 Diploma in Plant Maintenance has been developed to give learners the opportunity to:

- engage in learning that is relevant to them and which will provide opportunities to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life
- achieve a nationally recognised Level 2 vocationally-related qualification
- progress to employment in a particular vocational sector
- progress to related general and/or vocational qualifications.

National Occupational Standards

Where relevant, Edexcel BTEC level 2 qualifications are designed to provide some of the underpinning knowledge and understanding for the National Occupational Standards (NOS), as well as developing practical skills in preparation for work and possible achievement of NVQs in due course. NOS form the basis of National Vocational Qualifications (NVQs). Edexcel BTEC Level 2 (QCF) qualifications do not purport to deliver occupational competence in the sector, which should be demonstrated in a work context.

Rules of combination

The rules of combination specify the credits that need to be achieved, through the completion of particular units, for the qualification to be awarded. All accredited qualifications within the QCF have rules of combination.

Rules of combination for the Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)

When combining units for an Edexcel BTEC Level 2 in Plant Maintenance (QCF), it is the centre's responsibility to ensure that the following rules of combination are adhered to.

Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)

1 Qualification credit value: a minimum of 85 credits.

2 Minimum credit to be achieved at, or above, the level of the qualification: 85 credits.

3 All credits must be achieved from the units listed in this specification.

Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)

The Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF) is an 85 credit and 831 guided learning hour (GLH) qualification that consists of 11 mandatory units which provide for a combined total of 85 credits.

Edexcel BTEC Level 2 Diploma in Plant Maintenance (QCF)				
Unit	**Reference**	**Mandatory units**	**Credit**	**Level**
1	L/601/9230	Plant Maintenance Workshop Practices	5	2
2	L/601/9244	Carry Out Service and Maintenance Requirements	7	2
3	Y/601/9246	Removal and Replacement of Components and Assemblies	30	2
4	H/601/9248	Removal and Replacement of Small Plant and Tool Components and Assemblies	10	2
5	M/601/9253	Fabricate, Form and Join Materials to Produce and Repair Components	12	2
6	D/601/9264	Diagnostic and Condition Assessment Procedures	3	2
7	K/601/9266	Carry Out Test Procedures on Plant and Equipment	3	2
8	T/601/9268	Handle Move and Support Loads	2	2
9	A/601/9269	Procedures to Configure Plant and Equipment	3	2
10	T/601/9271	Installation and Handover Procedures for Plant and Equipment	3	2
11	D/601/9250	Dismantle, Assess and Assemble Plant and Equipment Components	7	2

Assessment

All units within this qualification are internally assessed. The qualifications are criterion referenced, based on the achievement of all the specified learning outcomes.

To achieve a 'pass' a learner must have successfully passed **all** the assessment criteria.

Guidance

The purpose of assessment is to ensure that effective learning has taken place to give learners the opportunity to:

- meet the standard determined by the assessment criteria and
- achieve the learning outcomes.

All the assignments created by centres should be reliable and fit for purpose, and should be built on the unit assessment criteria. Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the specified criteria. Centres should enable learners to produce evidence in a variety of different forms, including performance observation, presentations and posters, projects or time-constrained assessments.

Centres are encouraged to emphasise the practical application of the assessment criteria, providing a realistic scenario for learners to adopt, and making maximum use of practical activities. The creation of assignments that are fit for purpose is vital to achievement and their importance cannot be over-emphasised.

The assessment criteria must be clearly indicated in the assignment briefs. This gives learners focus and helps with internal verification and standardisation processes. It will also help to ensure that learner feedback is specific to the assessment criteria.

When designing assignments briefs, centres are encouraged to identify common topics and themes. A central feature of vocational assessment is that it allows for assessment to be:

- current, ie to reflect the most recent developments and issues
- local, ie to reflect the employment context of the delivering centre
- flexible to reflect learner needs, ie at a time and in a way that matches the learner's requirements so that they can demonstrate achievement.

Qualification grade

Learners who achieve the minimum eligible credit value specified by the rules of combination will achieve the qualification at pass grade.

In the Edexcel BTEC level 2 Specialist qualifications each unit has a credit value which specifies the number of credits that will be awarded to a learner who has achieved the learning outcomes of the unit. This has been based on:

- one credit for those learning outcomes achievable in 10 hours of learning time
- learning time being defined as the time taken by learners at the level of the unit, on average, to complete the learning outcomes of the unit to the standard determined by the assessment criteria
- the credit value of the unit remaining constant regardless of the method of assessment used or the qualification to which it contributes.

Quality assurance of centres

Quality assurance is at the heart of vocational qualifications. The centre assesses BTEC qualifications. The centre will use quality assurance to make sure that their managers, internal verifiers and assessors are standardised and supported. Edexcel use quality assurance to check that all centres are working to national standards. It gives us the opportunity to identify and provide support, if needed, to safeguard certification. It also allows us to recognise and support good practice.

For the qualifications in this specification, the Edexcel quality assurance model will follow one of the three processes listed below.

1 Delivery of the qualification as part of a BTEC apprenticeship (single click registration)

   - an annual visit by a Standards Verifier to review centre-wide quality assurance systems and sampling of internal verification and assessor decisions

2 Delivery of the qualification outside the apprenticeship

   - an annual visit to the centre by a Centre Quality Reviewer to review centre-wide quality assurance systems
   - Lead Internal Verifier accreditation. This involves online training and standardisation of Lead Internal Verifiers using our OSCA platform, accessed via Edexcel Online. Please note that not all qualifications will include Lead Internal Verifier accreditation. Where this is the case, we will annually allocate a Standards Verifier to conduct postal sampling of internal verification and assessor decisions for the Principal Subject Area.

For further details, go to the UK BTEC Quality Assurance Handbook 2011-12 on our website www.edexcel.com

Approval

Centres are required to declare their commitment to ensuring the quality of the programme of learning and providing appropriate assessment opportunities for learners that lead to valid and accurate assessment outcomes. In addition, centres commit to undertaking defined training and online standardisation activities.

Centres already holding BTEC approval may gain qualification approval online. New centres must complete a centre approval application.

Quality Assurance Guidance

Details of quality assurance for the Edexcel BTEC Level 2 qualifications are set out in centre guidance which is published on our website (www.edexcel.com).

Programme design and delivery

Mode of delivery

Edexcel does not normally define the mode of delivery for Edexcel BTEC Entry to level 3 qualifications. Centres are free to offer the qualifications using any mode of delivery (such as full-time, part-time, evening only, distance learning) that meets their learners' needs. Whichever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified in the specification and to the subject specialists delivering the units. This is particularly important for learners studying for the qualification through open or distance learning.

Learners studying for the qualification on a part-time basis bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors. The use of assessment evidence drawn from learners' work environments should be encouraged. Those planning the programme should aim to enhance the vocational nature of the qualification by:

- liaising with employers to ensure a course relevant to learners' specific needs
- accessing and using non-confidential data and documents from learners' workplaces
- including sponsoring employers in the delivery of the programme and, where appropriate, in the assessment
- linking with company-based/workplace training programmes
- making full use of the variety of experience of work and life that learners bring to the programme.

Resources

Edexcel BTEC level 2 qualifications are designed to give learners an understanding of the skills needed for specific vocational sectors. Physical resources need to support the delivery of the programme and the assessment of the learning outcomes, and should therefore normally be of industry standard. Staff delivering programmes and conducting the assessments should be familiar with current practice and standards in the sector concerned. Centres will need to meet any specific resource requirements to gain approval from Edexcel.

Delivery approach

It is important that centres develop an approach to teaching and learning that supports the vocational nature of Edexcel BTEC Level 2 qualifications and the mode of delivery. Specifications give a balance of practical skill development and knowledge requirements, some of which can be theoretical in nature. Tutors and assessors need to ensure that appropriate links are made between theory and practical application and that the knowledge base is applied to the sector. This requires the development of relevant and up-to-date teaching materials that allow learners to apply their learning to actual events and activity within the sector. Maximum use should be made of learners' experience.

Additional and specialist learning

Additional and Specialist Learning (ASL) consists of accredited qualifications at the same level as, or one level above a 14-19 Diploma course of study, which have been approved under Section 96 of the Learning and Skills Act 2000. The ASL may include BTEC qualifications which are also available to learners not following a 14-19 Diploma course of study.

ASL qualifications are listed on the 14-19 Diploma Catalogue which is available on the Register of Regulated Qualifications (www.ofqual.gov.uk). The catalogue will expand over time as more qualifications are accredited and approved.

Centres undertaking, or preparing to undertake, ASL should refer regularly to the Edexcel website for information regarding additions and the 14-19 Diploma Catalogue for the latest information.

Functional skills

Edexcel Level 2 BTEC Specialist qualifications give learners opportunities to develop and apply functional skills. Functional skills are, however, not required to be achieved as part of the BTEC Specialist qualification(s) rules of combination. Functional skills are offered as stand-alone qualifications.

Access and recruitment

Edexcel's policy regarding access to its qualifications is that:

- they should be available to everyone who is capable of reaching the required standards
- they should be free from any barriers that restrict access and progression
- there should be equal opportunities for all wishing to access the qualifications.

Centres are required to recruit learners to BTEC qualifications with integrity. This will include ensuring that applicants have appropriate information and advice about the qualifications and that the qualifications will meet their needs. Centres should take appropriate steps to assess each applicant's potential and make a professional judgement about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Edexcel's policy on learners with particular requirements.

Centres will need to review the entry profile of qualifications and/or experience held by applicants, considering whether this profile shows an ability to progress to a higher level qualification.

Restrictions on learner entry

The Edexcel BTEC Level 2 Diploma in Plant Maintenance is accredited on the QCF for learners aged 16 and above.

Access arrangements and special considerations

Edexcel's policy on access arrangements and special considerations for BTEC and Edexcel NVQ qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the Equality Act 2010) without compromising the assessment of skills, knowledge, understanding or competence.

Further details are given in the policy document *Access Arrangements and Special Considerations for BTEC and Edexcel NVQ Qualifications*, which can be found on the Edexcel website (www.edexcel.com). This policy replaces the previous Edexcel policy (Assessment of Vocationally Related Qualifications: Regulations and Guidance Relating to Learners with Special Requirements, 2002) concerning learners with particular requirements.

Recognition of Prior Learning

Recognition of Prior Learning (RPL) is a method of assessment (leading to the award of credit) 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 so do not need to develop through a course of learning.

Edexcel encourages centres to recognise learners' previous achievements and experiences whether at work, home, leisure, as well as in the classroom.

RPL provides a route for the recognition of the achievements resulting from continuous learning.

RPL enables recognition of achievement from a range of activities using any valid assessment methodology. Provided that the assessment requirements of a given unit or qualification have been met, the use of RPL is acceptable for accrediting a unit, units or a whole qualification. Evidence of learning must be sufficient, reliable and valid.

Unit format

All units in the Edexcel BTEC Level 2 Specialist qualifications have a standard format. The unit format is designed to give guidance on the requirements of the qualification for learners, tutors, assessors and those responsible for monitoring national standards.

Each unit has the following sections.

Unit title

The unit title is accredited on the QCF and this form of words will appear on the learner's Notification of Performance (NOP).

Unit code

Each unit is assigned a QCF unit code that appears with the unit title on the National Database of Accredited Qualifications.

QCF level

All units and qualifications within the QCF will have a level assigned to them, which represents the level of achievement. There are nine levels of achievement, from Entry Level to Level 8. The level of the unit has been informed by the QCF level descriptors and, where appropriate, the NOS and/or other sector/professional benchmarks.

Credit value

All units have a credit value. The minimum credit value that may be determined for a unit is one, and credits can only be awarded in whole numbers. Learners will be awarded credits for the successful completion of whole units.

Guided learning hours

Guided learning hours are defined as all the times when a tutor, trainer or facilitator is present to give specific guidance towards the learning aim being studied on a programme. This definition includes lectures, tutorials and supervised study in, for example, open learning centres and learning workshops. It also includes time spent by staff assessing learners' achievements. It does not include time spent by staff in day-to-day marking of assignments or homework where the learner is not present.

Unit aim

The aim provides a clear summary of the purpose of the unit and is a succinct statement that summarises the learning outcomes of the unit.

Learning outcomes

The learning outcomes of a unit set out what a learner is expected to know, understand or be able to do as the result of a process of learning.

Assessment criteria

The assessment criteria of a unit specify the standard a learner is expected to meet to demonstrate that a learning outcome, or set of learning outcomes, has been achieved. The learning outcomes and assessment criteria clearly articulate the learning achievement for which the credit will be awarded at the level assigned to the unit.

Unit content

The unit content identifies the breadth of knowledge, skills and understanding needed to design and deliver a programme of learning to achieve each of the learning outcomes. This is informed by the underpinning knowledge and understanding requirements of the related National Occupational Standards (NOS), where relevant. The content provides the range of subject material for the programme of learning and specifies the skills, knowledge and understanding required for achievement of the unit.

Key phrases or concepts relating to the learning outcomes are listed in italics followed by the subsequent range of related topics.

Relationship between content and assessment criteria

The learner should have the opportunity to cover all of the unit content.

It is not a requirement of the unit specification that all of the content is assessed. However, the indicative content will need to be covered in a programme of learning in order for learners to be able to meet the standard determined in the assessment criteria.

Content structure and terminology

The information below shows how the unit content is structured and gives the terminology used to explain the different components within the content.

- Italicised sub-heading: it contains a key phrase or concept. This is content which must be covered in the delivery of the unit. Colons mark the end of an italicised sub-heading.
- Elements of content: the elements are in plain text and amplify the sub-heading. The elements must be covered in the delivery of the unit. Semi-colons mark the end of an element.
- Brackets contain amplification of content which must be covered in the delivery of the unit.
- 'eg' is a list of examples, used for indicative amplification of an element (that is, the content specified in this amplification could be covered or could be replaced by other, similar material).

Essential guidance for tutors

This section gives tutors additional guidance and amplification to aid understanding and a consistent level of delivery and assessment. It is divided into the following sections.

- *Delivery* – explains the content's relationship to the learning outcomes and offers guidance about possible approaches to delivery. This section is based on the more usual delivery modes but is not intended to rule out alternative approaches.
- *Assessment* – gives amplification about the nature and type of evidence that learners need to produce in order to achieve the unit. This section should be read in conjunction with the assessment criteria.

Units

Unit 1: Plant Maintenance Workshop Practices

Unit code: L/601/9230

QCF level : 2

Credit value: 5

Guided learning hours: 47

Unit aim

The aim of this unit is to enable learners to acquire the skills and, knowledge required to carry out plant maintenance workshop practices including using safe methods and procedures. Learners will understand how to safely prepare the work area, (including resources and equipment) communicate with others in the work area and how to reinstate the work area on completion of the work activity.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to apply safe practices and procedures in the workplace.	1.1	Identify and apply relevant safety procedures and practices in accordance with legislation and the work instructions.
		1.2	Comply with the relevant information to: – select, handle, store and protect resources – use resources and dispose of waste.

Learning outcomes		Assessment criteria	
2	Know how to restore the work area on completion of the work activities.	2.1	Describe the methods for dealing with spillages and surplus lubricants.
		2.2	Describe the methods and requirements for: – reinstating work areas after use – storing items for further use – returning items for exchange – cleaning and clearing the work area – dealing with problems.
3	Know how to apply safe practices and procedures in the workplace.	3.1	Describe the health and safety requirements relating to the area where work is to be carried out.
		3.2	Describe the different types and uses of relevant personal protective equipment (PPE).
		3.3	Describe the different types and uses of fire extinguishers.
		3.4	Describe the different types of emergencies and hazards that could occur and the correct methods of dealing with them.
		3.5	Describe the information sources, types, uses and requirements: – eg technical, product information etc.
4	Be able to prepare the work area to carry out specified work activities.	4.1	Ensure suitable services are available and in working order as appropriate to the working area.
		4.2	Ensure safe access and egress to the work area for plant, equipment, resources and personnel.
		4.3	Carry out a familiarisation tour of the surrounding work area.
		4.4	Provide safety notices and barriers in accordance with legislation and appropriate to the work.

Learning outcomes		Assessment criteria	
5	Know how to prepare the work area to carry out specified work activities.	5.1	Describe the different types of safety notices and precautions required for specific areas.
		5.2	Describe work area preparation requirements and methods.
6	Be able to communicate with others when preparing the work area.	6.1	Inform other personnel of impending work activities if they may affect their own work.
		6.2	Communicate clearly with colleagues when organising the work effectively and in conjunction with the needs of others.
7	Know how to communicate with others when preparing the work area.	7.1	Describe the reasons for and methods used to accurately relay information in the workshop/clients premises and on site using different techniques: – eg orally, in writing, by telephone, texting, e-mail, fax.
		7.2	Describe the methods used to ascertain the requirements and deal with: – visitors, customers, clients.
		7.3	Describe the different methods to report and record information correctly and the information sources used for reporting.
		7.4	Describe the need for and the methods used to promote good working relationships with colleagues and clients.

Learning outcomes		Assessment criteria	
8	Be able to prepare resources and equipment to carry out the work activity.	8.1	Provide safe and secure storage for materials and components.
		8.2	Ensure resources are readily available in relation to: – specialist tools and equipment – spares and consumables.
		8.3	Ensure adequate handling equipment is provided if appropriate.
		8.4	Ensure adequate and appropriate waste disposal facilities are provided (hazardous and non-hazardous waste).
9	Know how to prepare resources and equipment to carry out the work activity.	9.1	Describe the different types of materials and resources required for plant maintenance activities and the procedures for selecting and preparing them.
		9.2	Describe the types of defects that could be associated with different resources.
		9.3	Describe the visual inspection procedures and care of tools and equipment.
		9.4	Describe the arrangements required for the correct disposal of waste.
10	Be able to restore the work area on completion of the work activities.	10.1	Carry out cleaning and tidying activities during and after the work.
		10.2	Restore the work areas after completion of the work.
		10.3	Store reusable resources ready for reuse.

Unit content

1 **Know and apply safe practices and procedures in the workplace**

Health and safety requirements: legislation; work instructions; storing; handling; waste disposal; selecting and using resources

2 **Know how to restore the work area on completion of the work activities**

Reinstating work areas: cleaning and tidying; storing reusable resources; returning items for exchange

Dealing with problems: spillages; surplus lubricants

3 **Prepare the work area to carry out specified work activities**

Service: working order; availability

Safe access: plant; equipment; resources; personnel

Safety notices: signs; symbols; barriers

4 **Communication with others in the work area**

Communication techniques: orally; in writing; by telephone; texting; e-mail; fax

Communicating with others: colleagues; visitors; clients; customers

Recording and reporting information: eg paper records, computer records

5 **Prepare resources and equipment to carry out the work activity**

Materials and resources: selection; availability eg specialist tools, consumables; handling equipment; visual inspections; identifying defects; waste disposal

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of plant maintenance workshop practices. Learners need to know and understand:

- safe practices and procedures in the workplace
- how to restore the work area on completion of the work activities
- how to prepare the work area for specified work activities
- how to communicate with others in the work area
- how to prepare resources and equipment to carry out the work activity

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of plant maintenance workshop practices.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of plant maintenance workshop practices.

Guest speakers could deliver presentations to learners. For example, a plant manager from a construction organisation could give a presentation on safe practices and procedures which deals with health and safety in the work area. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 2: Carry Out Service and Maintenance Requirements

Unit code: L/601/9244

QCF Level: 2

Credit value: 7

Guided learning hours: 66

Unit aim

The aim of this unit is enable the learner to acquire the skills and knowledge required to carry out service and maintenance requirements on plant and equipment. Preparation, execution and completion of service and maintenance tasks form the basis of the unit.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to carry out service and maintenance requirements.	1.1	Identify servicing and maintenance requirements for specific items of plant and equipment using manufacturers' and/or organisational literature.
		1.2	Prepare items of plant and equipment for servicing and minor adjustments.
		1.3	Select components, substances and materials required to carry out specified servicing/maintenance tasks.

Learning outcomes		Assessment criteria	
2	Know how to prepare to carry out service and maintenance requirements.	2.1	Describe how to use drawings, manuals, bulletins and other information sources relating to the maintenance of plant and equipment.
		2.2	Describe different plant and machinery layouts and identify information relating to servicing requirements.
		2.3	Describe the preparation requirements for plant and equipment prior to servicing and maintenance activities.
3	Be able to carry out service and maintenance requirements.	3.1	Remove, replenish and/or replace items and substances such as oils, filters etc.
		3.2	Remove, clean and refit air filters, water traps etc.
		3.3	Remove and replace items in accordance with given instructions such as: – belts, chains alternator – gaskets, seals – fastenings, fuses, bulbs etc.
		3.4	Apply the following as applicable to the type of equipment in accordance with manufacturers' specifications: – coolants, lubricants, fuel, grease, other substances.
		3.5	Carry out minor adjustments in accordance with specifications and given instructions.

Learning outcomes		Assessment criteria	
4	Know how to carry out service and maintenance requirements.	4.1	Explain the methods and safety precautions that should be taken when carrying out basic maintenance to plant and equipment in relation to: – removal of caps, plugs, dipsticks etc – applying fuels, lubricants, coolants, substances etc.
		4.2	Describe the methods of removing and replacing components: – eg oil and fuel filters, air cleaners, belts, water traps etc.
		4.3	Describe the types of routine adjustments, and the methods and procedures to carry them out on plant and equipment: – eg belts, chains, cables, linkages, clearances, brakes, clutches.
		4.4	Describe the methods, procedures and requirements for carrying out routine/non-routine maintenance.
		4.5	Describe the different types and uses of: – nuts, bolts, fastenings, pins, locking devices etc.
		4.6	Describe the different types of checks for diagnosing faults on plant and equipment: – eg sensory, smells, sounds, leaks etc.
5	Be able to carry out completion activities on conclusion of service and maintenance.	5.1	Clear the work area and dispose of hazardous and non-hazardous waste in accordance with legislation and the given instructions.
		5.2	Carry out functional checks after completion of servicing and maintenance activities.
		5.3	Complete all relevant documentation and records.

Learning outcomes		Assessment criteria	
6	Know how to carry out completion activities on conclusion of service and maintenance.	6.1	Describe the methods and requirements for the correct disposal of waste.
		6.2	Describe the methods of dealing with excess substances and spillages.
		6.3	Describe the method and requirements for reporting defects and problems.
		6.4	Describe the types of documentation and the methods used to report and record information

Unit content

1 **Prepare to carry out service and maintenance requirements**

Preparation information: manufacturer's literature; organisational literature; drawings; bulletins; manuals.

Preparation of equipment: components; substances; materials

2 **Service and maintenance requirements**

Safety precautions: removal of eg caps, plugs, dipsticks; applying fuels, lubricants, coolants, substances etc

Service and maintenance: plant equipment eg belts, chains, cables, linkages, clearances, brakes, clutches; components eg oil, filters, water taps, belts; chains alternator, gaskets, seals, fastenings, fuses, bulbs etc

Tools and their uses: eg nuts, bolts, fastenings, pins, locking devices etc.

Diagnosing faults: eg sensory, smells, sounds, leaks etc

3 **Completion activities on conclusion of service and maintenance**

Clearing the work area: hazardous waste disposal; non-hazardous waste disposal: excess substances; spillages

Reporting defects: functional checks; reporting information; documentation

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of service and maintenance requirements. Learners need to know and understand:

- preparation methods needed to carry out service and maintenance requirements.
- how to conduct service and maintenance requirements
- completion activities on conclusion of service and maintenance.

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of service and maintenance requirements.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of service maintenance requirements.

Guest speakers could deliver presentations to learners. For example, a plant supervisor could give a presentation on safety precautions. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 3: Removal and Replacement of Components and Assemblies

Unit code: Y/601/9246

QCF Level: 2

Credit value: 30

Guided learning hours: 296

Unit aim

The aim of this unit is to enable learners to acquire the skills and knowledge required to remove and replace components and assemblies, including work on power units, transmissions, braking systems, steering and suspension systems, hydraulic and pneumatic systems and plant electrical systems.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to remove and replace components and assemblies.	1.1	Identify requirements and prepare to remove components/assemblies from plant and equipment.
		1.2	Apply safety precautions and/or devices prior to starting disassembly procedures.

Learning outcomes		Assessment criteria	
2	Know the principles of low voltage electrical systems, components and assemblies.	2.1	Describe the different plant and equipment electrical system layouts, schematic diagrams and symbols, including charging, lighting, starting and control systems, batteries, semi conductor components.
		2.2	Describe the types, construction and operation of plant and equipment charging systems: – eg alternators, control systems.
		2.3	Describe the types, construction and operation of plant and equipment lighting systems.
		2.4	Describe the types, construction and operation of plant and equipment starting systems.
		2.5	Describe the different components and operation of plant and equipment electrical auxiliary systems: – eg wipers, horn, communication equipment.
		2.6	Describe the different types and connections (series/parallel), maintenance requirements of batteries and the relevant calculations.
		2.7	Describe the use of relevant calculations for electrical systems.
		2.8	Describe the removal and refitting procedures for specific components of plant electrical systems.
		2.9	Describe the methods, procedures and equipment required for testing electrical circuits and components.

Learning outcomes		Assessment criteria	
3	Be able to carry out completion activities on conclusion of removal and replacement of components and assemblies.	3.1	Carry out functional checks to ensure assembled components fully meet the operational requirements and complete relevant recording documentation.
		3.2	Prepare removed components for return, repair, by labelling etc.
		3.3	Clear the work area and dispose of hazardous and non-hazardous waste in accordance with legislation and the given instructions.
4	Know how to carry out completion activities on conclusion of removal and replacement of components and assemblies.	4.1	Describe the storage requirements for components and assemblies: – eg labelling etc.
		4.2	Describe the disposal requirements for unwanted components, assemblies and equipment.
		4.3	Describe the methods of carrying out functional checks.
		4.4	Describe the different types and methods of reporting and recording information.
5	Know how to prepare to remove and replace components and assemblies.	5.1	Describe the different types of information sources relating to the maintenance and repair of plant and equipment in relation to: – drawings, manuals, bulletins etc.
		5.2	Describe the safety requirements required before removing components and assemblies: – eg safety bars, releasing residual pressures, draining fluids, dust.

Learning outcomes		Assessment criteria	
6	Be able to remove and replace components and assemblies	6.1	Remove components/assemblies in accordance with manufacturers' information.
		6.2	Identify replacement components/ assemblies and prepare them for re-assembly.
		6.3	Fit replacement components/assemblies to plant and equipment.
		6.4	Fit and check controls and supply lines and replenish systems where required.
		6.5	Carry out adjustments and settings in accordance with manufacturers' information.
7	Know how to remove and replace components and assemblies.	7.1	Describe the techniques for removal of components: – eg isolation, marking, use of specialist tools, positioning, adjusting etc.
		7.2	Describe the methods and procedures for removing and replacing gaskets and seals.
		7.3	Describe the different types and uses of fastenings and locking devices.
		7.4	Describe the methods of identifying defects in components and assemblies.
		7.5	Describe the handling and supporting methods used when removing and fitting components.
		7.6	Describe the protection methods and care requirements for removed/partly removed components and equipment: – eg wrapping, taping etc.
		7.7	Describe the application methods for fuels, lubricants, coolants and substances in accordance with given instructions.
		7.8	Describe component removal methods: – eg pressing, pulling, drifting, unplugging, de-soldering etc.

Learning outcomes		Assessment criteria	
		7.9	Describe component replacement methods: – eg torque settings, clearances, lining up, pressing etc.
8	Know the principles of power unit components and assemblies.	8.1	Describe the types, construction and operation of power units: – eg two-stroke, four-stroke, petrol, diesel, gas.
		8.2	Describe the methods of calculating swept volumes and compression ratios.
		8.3	Describe the different types, operation and component parts of lubrication systems: – eg sumps, pumps, two-stroke oil, full flow filtration, oil coolers.
		8.4	Describe the different types, operation and component parts of cooling systems: – eg water pumps, thermostats, radiators, hoses, antifreeze, coolers, fans, cowlings.
		8.5	Describe the different types, operation and component parts of fuel systems: – eg carburettors, fuel injection pumps, lift pumps, fuel lines, filters, cold start devices.
		8.6	Describe the different types, operation and component parts of air systems: – eg filters, single and multi-stage turbochargers.
		8.7	Describe the different types, operation and component parts of electrical/electronic ignition systems: – eg plugs etc.
		8.8	Describe engine timing requirements and procedures for compression ignition and flywheel mag, electronic.
		8.9	Describe valve timing procedures and requirements.
		8.10	Describe the methods and procedures for adjusting valve clearances.

Learning outcomes		Assessment criteria	
9	Know the principles of transmission components and assemblies.	9.1	Describe transmission layouts for plant and equipment to include wheeled and tracked machines.
		9.2	Describe track assemblies, components and layouts: – eg plates, pins, bushes, links, rollers, idlers.
		9.3	Describe the different types and construction of wheels and tyres: – eg split rim and solid rim wheels, types and application of tyre treads, inflation methods.
		9.4	Describe the different types, construction and operation of transmission units: – eg hydraulic, sliding mesh and constant mesh gearboxes, clutches, shafts, couplings, multiple drive units.
		9.5	Describe the different types and construction of final drive and reduction gear assemblies: – eg crown wheel and pinion, tracked/wheeled machine final drives.
		9.6	Describe the methods used for calculating ratios for: – gear, belt and chain drive systems.
		9.7	Describe the types, construction and operation of chain and belt transmission systems.
		9.8	Describe the operation and construction of torque converters.
		9.9	Describe the operation and construction of hydraulic transmission units to include clutch packs, controls and workshop settings.
		9.10	Describe the procedures for complete transmission unit removal and replacement.

Learning outcomes		Assessment criteria	
10	Know the principles of braking system components and assemblies.	10.1	Describe the braking system layouts for plant and equipment, including tracked and wheeled vehicles.
		10.2	Describe the types, construction and operation of braking systems: – eg mechanical, hydraulic, air, combined.
		10.3	Describe the removal and refitting procedures for braking system components: – eg brake shoes, disc brakes, calliper types, multi- plate, expanding type, wheel cylinders, master cylinders, actuators, cables, pins, rods.
		10.4	Describe the construction and operation of internal expanding and external contracting brake shoes and bands.
		10.5	Describe the adjustments and procedures required for braking systems.
		10.6	Describe the methods and procedures for bleeding hydraulic braking systems.
		10.7	Describe the frictional properties of materials and the effects of temperature rise.
		10.8	Describe the types and uses of airlines/pipes and connections for air braking systems.

Learning outcomes		Assessment criteria	
11	Know the principles of steering and suspension components and assemblies.	11.1	Describe steering system layouts for plant and equipment, including tracked and wheeled vehicles.
		11.2	Describe the types, construction and operation of steering systems: – eg mechanical power, power assisted, combined, tracked machines, rear wheel, all wheel, articulated, geometry.
		11.3	Describe the different types of suspension layouts for wheeled and tracked plant and equipment.
		11.4	Describe the construction and operation of plant and equipment suspension systems.
12	Know the principles of hydraulic and pneumatic components and assemblies.	12.1	Describe hydraulic and pneumatic system layouts for plant and equipment, tracked and wheeled machines, including relevant schematic diagrams and symbols.
		12.2	Describe the different types, construction and operation of plant and equipment hydraulic systems: – eg pumps, motors, actuators, pressure control valves, flow control valves, pipes and hoses, reservoirs, filters.
		12.3	Describe the methods of carrying out calculations using force, pressure and area formulae.
		12.4	Describe the removal and refitting procedures for specified hydraulic system components.
		12.5	Describe the different types, construction and operation of pneumatic systems: – eg rotary, reciprocating and screw compressors, control valves, filters, reservoirs, airlines and couplings, water traps, coolers, motors, actuators.
		12.6	Describe the removal and refitting procedures for specified pneumatic system components

Unit content

1 **Prepare to remove and replace components and assemblies.**

Information relating to maintenance and repair: eg drawings, manuals, bulletins etc

Safety precautions: disassembly eg safety devices, safety bars, releasing residual pressures, draining fluids, dust

2 **Remove and replace components and assemblies**

Removal of components and assemblies: manufacturers' information on removal; removal techniques eg isolation, marking, use of specialist tools, positioning, adjusting etc; removal methods eg pressing, pulling, drifting, unplugging, de-soldering etc; identification for reassembly; gaskets and seals; identification of defects

Replacement of component and assemblies: fit and check eg components, controls, supply lines; replenishment of systems; adjustments and control settings; gaskets and seals; fastenings and locking devices; handling and protection methods eg wrapping, taping etc; application methods eg fuels, lubricants, coolants; component replacement methods eg torque settings, clearances, lining up, pressing etc

3 **Completion activities on conclusion of removal and replacement of components and assemblies**

Functional checks: operational methods and requirements; relevant recording documentation.

Removed components: prepare for return; repair; labelling etc

Work area: clear; disposal of hazardous waste; disposal of non-hazardous waste; legislation regarding disposal of waste; instructions on how to dispose of waste; unwanted components assemblies and equipment eg disposal requirements.

4 **Low voltage electrical systems, components and assemblies**

Electrical system layouts: schematic diagrams and symbols: charging; lighting; starting and control systems; batteries; semi conductor components.

Plant and electrical equipment: charging systems eg alternators, control systems; lighting systems; starting systems; electrical auxiliary systems: eg wipers, horn, communication equipment; connections eg series/parallel, batteries; relevant calculations; removal; refitting; testing eg circuits, components.

5 Power unit components and assemblies

Power units: types; construction; operation eg two-stroke, four-stroke, petrol, diesel, gas; calculations eg swept volumes, compression ratios

Lubrication systems: types; construction; operation eg sumps, pumps, two-stroke oil, full flow filtration, oil coolers

Cooling systems: types; construction; operation eg water pumps, thermostats, radiators, hoses, antifreeze, coolers, fans, cowlings

Fuel systems: types; construction; operation eg carburettors, fuel injection pumps, lift pumps, fuel lines, filters, cold start devices

Air systems: types; construction; operation eg filters, single and multi-stage turbochargers

Electrical/electronic ignition systems: types; construction; operation eg plugs etc

Timing procedures and requirements: engine eg compression ignition, flywheel mag, electronic; valves; valve clearances

6 Transmission components and assemblies

Transmission layouts: wheeled, tracked machines

Track assemblies, components and layouts: eg plates, pins, bushes, links, rollers, idlers

Wheels and tyres: eg split rim and solid rim wheels, types; application of tyre treads; inflation methods

Transmission units: types; construction; operation eg hydraulic, sliding mesh gearboxes, constant mesh gearboxes, clutches, shafts, couplings, multiple drive units

Final drive and reduction gear assemblies: types; construction eg crown wheel and pinion, tracked/wheeled machine final drives

Calculation of ratios: gear, belt, chain drive systems

Chain and belt transmission systems: types, construction, operation

Operation and construction: torque converters, hydraulic transmission units, eg clutch packs, controls and workshop settings

Removal and replacement: complete transmission unit

7 **Braking system components and assemblies**

Braking system layouts for plant and equipment: tracked vehicles; wheeled vehicles

Braking systems: types; construction; operation eg mechanical, hydraulic, air, combined; internal expanding brake shoes and bands; external contracting brake shoes and bands

Removal and refitting procedures for braking system: components eg brake shoes, disc brakes, calliper types, multi- plate, expanding type, wheel cylinders, master cylinders, actuators, cables, pins, rods

Methods and procedures: adjustments; bleeding hydraulic systems

Materials: frictional properties; effects of temperature rise

Air braking systems: types; uses eg of airlines/pipes, connections

8 **Steering and suspension components and assemblies**

Steering system layouts for plant and equipment: tracked vehicles; wheeled vehicles

Steering systems: types; construction; operation eg mechanical power, power assisted, combined, tracked machines, rear wheel, all wheel, articulated, geometry

Plant and equipment suspension: suspension layouts eg wheeled; tracked plant and equipment; suspension construction; suspension operation.

9 **Hydraulic and pneumatic components and assemblies**

Hydraulic and pneumatic system layouts: plant and equipment; tracked and wheeled machines, eg relevant schematic diagrams and symbols

Plant and equipment hydraulic systems: types; construction; operation eg pumps, motors, actuators, pressure control valves, flow control valves, pipes and hoses, reservoirs, filters

Calculation methods: force; pressure; area formulae

Pneumatic systems: types; construction; operation eg rotary, reciprocating and screw compressors, control valves, filters, reservoirs, airlines and couplings, water traps, coolers, motors, actuators

Removal and refitting procedures: specified hydraulic system components; specified pneumatic system components

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of removal and replacement of components and assemblies. Learners need to know and understand:

- how to prepare to remove and replace components and assemblies.
- low voltage electrical systems, components and assemblies
- completion activities on conclusion of removal and replacement of components and assemblies.
- power unit components and assemblies
- transmission components and assemblies.
- braking system components and assemblies.
- steering and suspension components and assemblies
- hydraulic and pneumatic components and assemblies

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of removal and replacement of components and assemblies.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of removal and replacement of components and assemblies. Guest speakers could deliver presentations to learners. For example, a mechanic from a construction company could give a presentation on braking or steering system components and assemblies. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 4: Removal and Replacement of Small Plant and Tool Components and Assemblies

Unit code: H/601/9248

QCF Level: 2

Credit value: 10

Guided learning hours: 96

Unit aim

The aim of this unit is to enable learners to acquire the skills and knowledge required to replace small plant and tool components and assemblies, including preparation and completion procedures.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to remove and replace small plant and tool components and assemblies.	1.1	Identify requirements and prepare to remove components/assemblies from small plant and tools.
		1.2	Apply safety precautions and/or devices prior to starting disassembly procedures.
2	Know how to prepare to remove and replace small plant and tool components and assemblies.	2.1	Describe the different types of information sources relating to the maintenance and repair of small plant and tools: – drawings, manuals, bulletins etc.
		2.2	Describe the safety requirements required before removing components and assemblies.

Learning outcomes		Assessment criteria	
3	Be able to remove and replace small plant and tool components and assemblies.	3.1	Remove components/assemblies in accordance with manufacturers' information.
		3.2	Identify replacement components/assemblies and prepare them for re-assembly.
		3.3	Fit replacement components/assemblies to small plant and tools.
4	Know how to remove and replace small plant and tool components and assemblies.	4.1	Describe the techniques for removal of components: – eg isolation, marking, use of specialist tools.
		4.2	Describe the types and uses of fastenings and locking devices.
		4.3	Describe the methods of identifying defects in components and assemblies.
		4.4	Describe the handling and supporting methods used when removing and fitting components and assemblies.
		4.5	Describe the methods of providing protection to components and assemblies.
		4.6	Describe component replacement methods: – eg torque settings, clearances, lining up.

Learning outcomes		Assessment criteria	
5	Know the principles of small plant and tool components and assemblies.	5.1	Describe the different small plant and tool layouts: – eg water pumps, generators, electric tools, cleaning equipment, mixers etc.
		5.2	Describe the different types, construction and operation of small plant and tools: – eg generators, pneumatic tools, electric tools, cleaning equipment, mixers etc.
		5.3	Describe the different types, construction and uses of ancillary equipment: – eg connections, extension leads, transformers, water pipes etc.
		5.4	Describe the removal and refitting procedures for small plant and tool components.
6	Be able to carry out completion activities on conclusion of removal and replacement of small plant and tool components and assemblies.	6.1	Carry out functional checks to ensure assembled components fully meet the operational requirements and complete relevant recording documentation.
		6.2	Prepare removed components for return, repair, by labelling etc.
		6.3	Clear the work area and dispose of hazardous and non-hazardous waste in accordance with legislation and the given instructions.
7	Know how to carry out completion activities on conclusion of removal and replacement of small plant and tool components and assemblies. Know how to carry out completion activities on conclusion of removal and replacement of small plant and tool components and assemblies.	7.1	Describe the storage requirements for small plant and tool components.
		7.2	Describe the disposal requirements for unwanted components and equipment.
		7.3	Describe the methods of carrying out functional checks.
		7.4	Describe the different types and methods of reporting and recording information.

Unit content

1 **Prepare to remove and replace small plant and tool components and assemblies**

Information sources: eg drawings, manuals, bulletins etc

Safety: precautions; devices; disassembly

2 **Remove and replace small plant and tool components and assemblies**

Removal: techniques eg isolation, marking, use of specialist tools; fastenings and locking devices; preparation for reassembly; handling; supporting; protection

Replacement: identify defects; replacement methods: eg torque settings, clearances, lining up; fitting eg plant components, tool components

3 **Principles of small plant and tool components and assemblies**

Small plant and tool layouts: eg water pumps, generators, electric tools, cleaning equipment, mixers etc

Small plant and tools: eg generators, pneumatic tools, electric tools, cleaning equipment, mixers etc

Ancillary equipment: eg connections, extension leads, transformers, water pipes etc

Small plant and tool components: removal; re-fitting

4 **Completion activities on conclusion of removal and replacement of small plant and tool components and assemblies**

Functional checks: methods; operational requirements; recording documentation

Preparation of removed components: eg return, repair, labelling etc

Work area: storage requirements; legislation; hazardous waste; non hazardous waste; disposal eg components, equipment

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of removal and replacement of small plant and tool components and assemblies. Learners need to know and understand:

- how to prepare to remove and replace small plant and tool components and assemblies
- how to remove and replace of small plant and tool components and assemblies
- the principles of small plant and tool components and assemblies
- completion activities on conclusion of removal and replacement of small plant and tool components and assemblies

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of removal and replacement of small plant and tool components and assemblies.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of removal and replacement of small plant and tool components and assemblies. Guest speakers could deliver presentations to learners. For example, a plant operative from a construction organisation could give a presentation on identifying defects in small plant and tool components. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 5: Fabricate, Form and Join Materials to Produce and Repair Components

Unit code: M/601/9253

QCF Level: 2

Credit value: 12

Guided learning hours: 120

Unit aim

The aim of this unit is to enable learners to acquire the skills and knowledge required to fabricate, form and join materials by welding to produce and repair components for plant and machinery.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to fabricate, form and join materials to produce and repair components.	1.1	Identify requirements for fabricating, forming and joining materials from drawings and information sheets.
		1.2	Measure and mark out shapes and sizes to the given specification.
2	Know how to carry out activities to support the fabrication, forming and joining processes.	2.1	Describe the different methods and techniques for holding and supporting materials for welding activities.
		2.2	Describe the different types and uses of joints used in welding activities – eg butt, fillet, tee, lap, corner.
		2.3	Describe the different welding positions and techniques: – eg flat, horizontal, vertical etc.
		2.4	Describe the pre-welding requirements: – eg grinding, cleaning, wire brushing etc.

Learning outcomes		Assessment criteria	
		2.5	Describe the edge protection requirements: – eg square, single-vee, double-vee, edge etc.
		2.6	Describe the different assembly techniques: – eg tacking and clamping.
		2.7	Describe the methods used and requirements for pre-heating.
		2.8	Describe the post-welding requirements: – eg slag removal, spatter removal, removing excess metal etc.
		2.9	Explain the reasons for and methods used to avoid distortion during the welding process: – eg skip welding, back stepping, tack welding etc.
		2.10	Describe the methods and procedures for rectifying distorted components due to the welding process: – eg jacking, pressing, bending, hammering, rolling etc.
		2.11	Describe the methods of carrying out non-destructive and destructive testing of welds.
		2.12	Describe the different methods of recording and reporting information.
3	Know how to prepare to fabricate, form and join materials to produce and repair components.	3.1	Describe how to use drawings and information sheets.
		3.2	Describe the methods, tools and procedures for measuring and marking out materials ready for forming: – eg datums, angles, centre dots etc.
		3.3	Describe the safety requirements related to joining, forming and fabricating processes.
		3.4	Describe the metals and materials, their properties and uses related to joining and forming processes.

Learning outcomes		Assessment criteria	
4	Be able to fabricate and form materials to produce and repair components.	4.1	Fabricate and form materials by: – cutting, filing, drilling, bending, folding, grinding etc.
		4.2	Use the correct tools and equipment to cut threads, rivet and ream materials.
		4.3	Fabricate and form components using ferrous metals.
5	Know how to fabricate and form materials to produce and repair components.	5.1	Describe the methods and procedures for setting up and using bench drills and grinders.
		5.2	Describe how to check, use, care for and maintain bench fitting tools and equipment: – eg files, saws, drill bits, hammers, centre punches, reamers, taps, dies, etc.
		5.3	Describe the different types of metal bending, cutting and shaping tools and the methods of using them.
6	Be able to join materials to produce and repair components.	6.1	Select and prepare materials to be joined by soldering, brazing and welding processes.
		6.2	Set up tools, equipment/welding equipment to carry out soldering, brazing and welding of components.
		6.3	Carry out thermal joining of materials to produce and repair components using the following methods to the given specification: – soldering – gas welding/brazing – manual metal arc (MMA) welding – metal inert gas (MIG/MAG) welding.
		6.4	Carry out non-destructive and destructive testing of joined materials.

Learning outcomes		Assessment criteria	
7	Know how to gas weld joints to produce and repair components.	7.1	Describe how to set up and care for gas welding/brazing equipment, to include – types of fittings, use of flash back devices, gauges, cleanliness, nozzle sizes, flame settings.
		7.2	Describe the different types and uses of rods and fluxes for gas welding/brazing activities.
		7.3	Describe the methods and procedures for producing welded joints using gas equipment: – eg tacking, leftward, rightward, upward, downward etc.
8	Know how to weld manual metal arc (MMA) joints to produce and repair components.	8.1	Describe the types, selection, preparation and setting up requirements and procedures for equipment to carry out manual metal arc (MMA) welding.
		8.2	Describe the connection requirements and the construction and maintenance of leads to carry out (MMA) welding.
		8.3	Describe the types, sizes, construction, uses and covering characteristics of electrodes for (MMA) welding.
		8.4	Describe the types and uses of eye protection for (MMA) welding processes.

Learning outcomes		Assessment criteria	
9	Know how to weld metal inert gas (MIG/MAG) joints to produce and repair components	9.1	Describe the types, selection, preparation and setting up requirements and procedures for equipment to carry out metal inert gas (MIG/MAG) welding.
		9.2	Describe the different modes of metal transfer when (MIG/MAG) welding: – eg dip (short circuiting), globular, spray.
		9.3	Describe the types of welding guns used in (MIG/MAG) welding activities: – eg water cooled, air cooled.
		9.4	Describe the different types and uses of nozzles and tips for (MIG/MAG) welding.
		9.5	Describe the different types, construction and uses of electrodes used for (MIG) welding activities: – eg sizes, reels, deoxidisers and coatings.
		9.6	Describe the construction, uses and maintenance of leads and connections.
		9.7	Describe the gas supply and distribution requirements and mixtures for various applications.
		9.8	Describe the types and uses of cylinders, regulators, gas flow meters, tubes and connections.
		9.9	Describe the different wire feed, cooling and gas flow systems.

Unit content

1 **Prepare to fabricate, form and join materials to produce and repair components**

Requirements: drawings; information sheets

Methods: measure; mark out eg shapes, sizes; procedures eg datums, angles, centre dots etc

Safety requirements: joining; forming; fabricating

Metals and materials: properties; uses

2 **Carry out activities to support the fabrication, forming and joining processes**

Pre-welding: eg grinding, cleaning, wire brushing; pre-heating

Welding: holding; supporting; joints eg butt, fillet, tee, lap, corner; positions, eg flat, horizontal, vertical

Edge protection: eg square, single-vee, double-vee, edge

Assembly techniques: eg tacking and clamping

Post-welding requirements: eg slag removal, spatter removal, removing excess metal

Avoiding distortions: eg skip welding, back stepping, tack welding etc

Rectifying distortions: eg jacking, pressing, bending, hammering, rolling etc

Testing: non-destructive; destructive

Information: recording; reporting

3 **Fabricate and form materials to produce and repair components**

Methods and procedures: cutting; filing; drilling; bending; folding; grinding; cut threads; rivet; ream materials; ferrous metals

Tools and equipment: bench drills; grinders; bench fitting tools and equipment eg files, saws, drill bits, hammers, centre punches, reamers, taps, dies, etc; metal bending tools; cutting tools; shaping tools

4 **Join materials to produce and repair components**

Methods and procedures: selection of materials; preparation of materials; tool set-up

Thermal joining: soldering; gas welding/brazing; manual metal arc (MMA) welding; metal inert gas (MIG/MAG) welding

Testing of joined material: non-destructive; destructive

5 **Gas weld joints to produce and repair components**

Equipment: care; set up; fittings; flash back devices; gauges; cleanliness; nozzle sizes; flame settings; rods; fluxes

Methods and procedures: eg tacking, leftward, rightward, upward, downward

6 **Weld manual metal arc (MMA) joints to produce and repair component**

Requirements and procedures: types; selection; preparation; setting up; connection requirements; construction and maintenance of leads

Electrodes: types; sizes; construction; uses; covering

Eye protection: types; uses

7 **Weld metal inert gas (MIG/MAG) joints to produce and repair components**

Equipment: types; selection; preparation; setting up

Modes of metal transfer: eg dip (short circuiting), globular, spray

Types of welding guns: eg water cooled, air cooled

Nozzles and tips: types; uses

Electrodes: types eg sizes, reels, deoxidisers and coatings; construction; uses

Leads and connections: construction; uses; maintenance

Gas flow: supply; distribution; cylinders; regulators; gas flow meters; tubes and connection

Systems: wire feed; cooling; gas flow

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of fabricating, forming and joining materials to produce and repair components. Learners need to know and understand:

- how to prepare to fabricate, form and join materials to produce and repair components.
- how to support the fabrication, forming and joining processes.
- how to fabricate, form and join materials
- weld using gas MMA, MIG and MAG

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of fabricating, forming and joining materials to produce and repair components.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of fabrication, formation and joining materials to produce and repair components. Guest speakers could deliver presentations to learners. For example, a welder from a construction plant could give a presentation on thermal joining. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 6: Diagnostic and Condition Assessment Procedures

Unit code: D/601/9264

QCF Level: 2

Credit value: 3

Guided learning hours: 30

Unit aim

The aim of this unit is to enable learners to acquire the skills and knowledge required to carry out diagnostic and condition assessment procedures including: identifying defects and faults on plant and machinery, diagnosing defects and faults and carrying out inspections on plant and machinery.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to carry out diagnostic and condition assessment procedures.	1.1	Interpret and use plant and equipment records and information to determine diagnostic and condition requirements.
2	Know how to prepare to carry out diagnostic and condition assessment procedures.	2.1	Describe the information sources required to carry out diagnostic and inspection activities: – eg manufacturers' manuals, bulletins, word of mouth, operator reports, drawings etc.
		2.2	Describe the statutory requirements and codes of practice relating to the inspection of plant and equipment.
		2.3	Describe the methods of setting up and calibrating diagnostic equipment prior to performing performance checks.

Learning outcomes		Assessment criteria	
3	Be able to carry out diagnostic and condition assessment procedures.	3.1	Identify, set up and use diagnostic aids and techniques to identify problems with machinery and equipment.
		3.2	Inspect plant and equipment for operational serviceability using appropriate equipment and specifications, in accordance with manufacturers' instructions and recommendations.
4	Know how to carry out diagnostic and condition assessment procedures.	4.1	Describe the methods and techniques used to diagnose faults on plant and equipment: – eg visual, smell, touch, hearing, multi meters, gauges, computer programmes, test lamps, tachometer etc.
		4.2	Describe the types of faults common to plant and equipment: – eg continual and intermittent faults, breakdowns.
		4.3	Describe the types of checks that could be carried out on plant and equipment: – eg daily, weekly, monthly, pre-delivery, post-repair, functional, operational hours etc.
		4.4	Describe the types of defects common to plant and equipment: – eg deterioration, damage, far wear and tear, leaks, excessive wear etc.
		4.5	Describe the types of critical defects common to plant and equipment: – eg safety problems, safety defects etc.
		4.6	Describe the types of non-critical defects common to plant and equipment: – eg minor defects, adjustments etc.

Learning outcomes		Assessment criteria	
5	Be able to carry out completion activities on conclusion of diagnostic and condition assessment procedures.	5.1	Record and analyse results of diagnostic and assessment programmes in accordance with manufacturers' specifications.
6	Know how to carry out completion activities on conclusion of diagnostic and condition assessment procedures.	6.1	Describe the methods and techniques for collating and interpreting diagnostic and assessment results.
		6.2	Describe the requirements for reporting and recording the results of diagnostic and inspection activities.

Unit content

1 **Prepare to carry out diagnostic and condition assessment procedures**

Plant and equipment records: eg manufacturers' manuals, bulletins, word of mouth, operator reports, drawings etc

Plant and equipment inspection: statutory requirements, codes of practice

Diagnostic equipment: eg calibration

2 **Diagnostic and condition assessment procedures**

Aids and techniques: eg visual, smell, touch, hearing, multi meters, gauges, computer programmes, test lamps, tachometer etc

Types of faults: continual; intermittent; breakdowns

Types of checks: eg daily, weekly, monthly, pre-delivery, post-repair, functional, operational hours etc

Types of defects: critical; eg safety problems, safety defects; non critical eg minor defects, adjustments; deterioration; damage; far wear and tear; leaks; excessive wear

3 **Completion activities on conclusion of diagnostic and condition assessment procedures.**

Results: recording; assessing eg to manufacturer's specifications; inspections; collating; interpreting

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of Diagnostic and Condition Assessment Procedures. Learners need to know and understand:

- how to prepare for diagnostic and condition assessment procedures.
- diagnostic and condition assessment procedures.
- completion activities on conclusion of diagnostic and condition assessment procedures

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of plant maintenance workshop practices.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of diagnostic and condition assessment procedures. Guest speakers could deliver presentations to learners. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 7: Carry Out Test Procedures on Plant and Equipment

Unit code: K/601/9266

QCF Level: 2

Credit value: 3

Guided learning hours: 30

Unit aim

The aim of this unit is to enable learners to acquire the skills and knowledge required to carry out test procedures on plant and equipment to assess their condition and to identify any faults in systems or components.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to carry out testing procedures to plant and equipment.	1.1	Identify the different types of tests to be carried out: – eg functional, diagnostic, operational, monitoring, substitution and elimination.
2	Know how to prepare to carry out testing procedures to plant and equipment.	2.1	Describe how to identify and interpret drawings, manuals, bulletins and other information sources relating to the testing of plant and equipment.
		2.2	Describe current legislation and Codes of Practice relating to the procedures for testing plant and equipment.
		2.3	Explain the different types of detail contained in test specifications relating to for example: – eg measurement, compliance, readings, working cycles, tolerances, statutory requirements.

Learning outcomes		Assessment criteria	
		2.4	Describe the different types of plant and machinery layouts in relation to their testing points.
3	Be able to select and set up tools and equipment to carry out test procedures to plant and equipment.	3.1	Select tools and equipment, calibrate and set up the equipment to carry out tests in accordance with the given specification.
4	Know how to select and set up tools and equipment to carry out test procedures to plant and equipment.	4.1	Explain the different types and uses of testing equipment: – eg pressure and flow gauges, computer aided devices, compression testers, temperature gauges, portable appliance testing equipment etc.
		4.2	Describe the different methods of checking and calibrating test equipment.
5	Be able to test plant and equipment for safe and efficient operation.	5.1	Carry out tests using correct procedures and practices.
		5.2	Demonstrate the use of appropriate tools and equipment to carry out tests to specification.
		5.3	Test plant and equipment under operational and non-operational conditions.
		5.4	Demonstrate the use of substitution and elimination techniques when carrying out the testing.
6	Know how to test plant and equipment for safe and efficient operation.	6.1	Explain the different types of testing procedures for systems and components to include: – engines, hydraulics, pneumatics, electrical, brakes and steering, chassis, suspension and transmissions, small tools.
		6.2	Describe the different types of testing methods: – eg diagnostic, operational, functional, sensory, visual, audible, touch, smell.
		6.3	Describe the different types of faults that may occur for example: – eg system faults, component faults, operational faults etc.

Learning outcomes		Assessment criteria	
		6.4	Describe the environmental responsibilities that need to be considered relating to: – pollution, noise, gases, fuels, fluids etc.
7	Be able to record results, produce reports and make recommendations on completion of test procedures.	7.1	Produce a report containing accurate test results in compliance with manufacturers' specifications and procedures.
		7.2	Analyse results and make recommendations based upon the report that are accurate and practicable.
8	Know how to record results, produce reports and make recommendations on completion of test procedures.	8.1	Describe the relevant reporting and recording procedures and practices
		8.2	Explain the possible actions required relating to varying test results: – eg immediate, safety considerations etc.

Unit content

1 **Prepare to carry out testing procedures to plant and equipment**

Types of tests: eg functional, diagnostic, operational, monitoring, substitution, elimination

Information sources: drawings; manuals; bulletins

Procedures: legislation; codes of practice

Test specifications: eg measurement, compliance, readings, working cycles, tolerances, statutory requirements

Layouts: types

2 **Select and set up tools and equipment to carry out test procedures to plant and equipment**

Equipment for testing: select tools; set up equipment to specification; types and uses, eg pressure and flow gauges, computer aided devices, compression testers, temperature gauges, portable appliance testing equipment etc; calibrate; checks

3 **Test plant and equipment for safe and efficient operation**

Procedures and practices for testing: types and uses of testing equipment eg engines, hydraulics, pneumatics, electrical, brakes and steering, chassis, suspension and transmissions, small tools; operational conditions; non operational conditions

Methods of testing: eg diagnostic, operational, functional, sensory, visual, audible, touch, smell; substitution; elimination

Environmental responsibilities: eg pollution, noise, gases, fuels, fluids etc

4 **Record results, produce reports and make recommendations on completion of test procedures**

Record results: recording procedures; accuracy; manufacturers' specifications; compliance

Producing a report: reporting procedures; results analysis; recommendations

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of test procedures on plant and equipment. Learners need to know and understand:

- how to prepare to carry out testing procedures to plant and equipment
- how to select and set up tools and equipment to carry out test procedures to plant and equipment
- how to record results, produce reports and make recommendations on completion of test procedures

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of test procedures on plant and equipment.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of test procedures on plant and equipment. Guest speakers could deliver presentations to learners. For example, a mechanic or plant operative could give a presentation on setting up tools and equipment to carry out test procedures. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 8: Handle, Move and Support Loads

Unit code: T/601/9268

QCF Level: 2

Credit value: 2

Guided learning hours: 20

Unit aim

The aim of to this unit is to enable students to acquire the skills, knowledge and understanding required handle, move and support loads using a variety of safe methods and techniques including jacking and supporting equipment and using mechanical aids to move and handle loads.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to handle, move and support loads.	1.1	Select equipment and materials to jack and support loads.
		1.2	Select and check equipment to move and handle loads.
		1.3	Establish weights and methods required to handle and move loads.
		1.4	Ensure that loads can be moved safely without causing damage.

Learning outcomes		Assessment criteria	
2	Know how to prepare to handle, move and support loads.	2.1	Describe the legislation requirements for the lifting and handling of loads.
		2.2	Describe the information given for lifting and handling equipment: – eg safe working load (SWL) markings etc.
		2.3	Describe the types and uses of lifting aids and handling equipment: – eg jacks, hoists, pry bars, rollers, trolleys, pulleys, skids etc.
		2.4	Describe the types and uses of supporting aids: – eg trestles, blocks.
		2.5	Describe the requirements and procedures for working on uneven surfaces and the importance of balance when moving loads.
		2.6	Describe the methods of establishing the weight of loads.
3	Be able to jack and support equipment for maintenance and repair activities.	3.1	Raise loads by using jacking and supporting equipment including: – winches, hoists, pulley and chain blocks, skids, mechanical/hydraulic jacks, wire/fabric ropes, powered/manual cranes(not requiring operator certification), pull lifts.
4	Know how to jack and support equipment for maintenance and repair activities.	4.1	Describe the different jacking and supporting techniques.
5	Be able to use mechanical aids to move and handle loads.	5.1	Attach appropriate handling equipment to loads including: – powered and manual trolleys, rollers.
		5.2	Ensure that loads are secure and evenly distributed before moving.
		5.3	Move loads over selected routes and place in the required location/position.

Learning outcomes		Assessment criteria	
6	Know how to use mechanical aids to move and handle loads.	6.1	Describe the different types of manual handling techniques, mechanical lifting and handling techniques.
		6.2	Describe the different slinging and signalling techniques.
		6.3	Describe the meaning of safe working loads (SWL) and the checking/inspection requirements for lifting equipment and aids.
		6.4	Describe the route planning requirements, considerations and techniques when moving and handling loads: – eg overhead services, traffic, other works, weather, visibility, ground conditions, risk assessment etc.
		6.5	Describe the types, construction, uses, care and control of handling equipment: – eg slings, shackles.
		6.6	Describe the methods and techniques for moving loads, including protection of loads and surrounds.
		6.7	Describe the types and uses of personal protective equipment (PPE) when handling and moving loads.
		6.8	Describe the different types of approved signals used when handling and moving loads.
		6.9	Describe the types and methods of reporting and recording information.

Unit content

1 **Prepare to handle, move and support loads**

Preparation: equipment eg select, check; establishing weight to be moved; methods eg handling, lifting, jacking, supporting

Safety: legislation, information eg safe working load (SWL), markings etc; uneven surfaces eg procedures; balance

Lifting aids and handling equipment: types and uses eg jacks, hoists, pry bars, rollers, trolleys, pulleys, skids etc

Supporting aids: types and uses eg trestles, blocks

2 **Jack and support equipment for maintenance and repair activities**

Techniques: winches, hoists, pulley and chain blocks, skids, mechanical/hydraulic jacks, wire/fabric ropes, powered/manual cranes (not requiring operator certification), pull lifts

3 **Using mechanical aids for moving and handling loads**

Mechanical aids: eg powered and manual trolleys, rollers

Lifting and techniques: manual; mechanical lifting and handling; slinging; signalling

Safety: securing loads; distribution of loads; safe working load; equipment checks; equipment inspection

Handling and lifting equipment: eg slings, shackles etc; types; construction; uses; care; control.

Moving loads: route planning eg overhead services, traffic, other works, weather, visibility, ground conditions, risk assessment etc; protection of loads; surrounds; PPE (personal protective equipment); signals

Information: reporting methods; recording methods

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of handling, moving and supporting loads. Learners need to know and understand:

- how to prepare for handling, supporting and moving loads
- how to jack and support loads for maintenance and repair activities
- how to use mechanical aids safely when handling, moving or lifting loads.

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of handling, supporting and moving loads.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of handling, supporting and moving loads. Guest speakers could deliver presentations to learners. For example, a plant supervisor could give a presentation on safe methods and techniques for moving loads. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 9: Procedures to Configure Plant and Equipment

Unit code: A/601/9269

QCF Level: 2

Credit value: 3

Guided learning hours: 30

Unit aim

The aim of this unit is to enable learners to acquire the skills, knowledge and understanding required to apply procedures to configure plant and equipment.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to configure plant and equipment.	1.1	Identify the correct settings and operating specifications from manufacturers' instructions.
2	Know how to prepare to configure plant and equipment.	2.1	Describe the health and safety legislation, regulations, codes of practice and safe working practices and procedures used when configuring plant and equipment.
		2.2	Describe the sources and types of information used for the configuration of plant and equipment: – eg manufacturers' manuals, installation guidelines, bulletins, method statements etc.

Learning outcomes		Assessment criteria	
3	Be able to configure plant and equipment.	3.1	Remove, replace and position components for configuration purposes.
		3.2	Use correct procedures and practices to set up plant and equipment to the given specifications.
		3.3	Ensure that all operating parameters are achieved.
		3.4	Check that the configuration is complete and operates to the given specification.
4	Know how to configure plant and equipment.	4.1	Describe the configuration methods and techniques applied to plant and equipment: – eg identifying job requirements, specific machine equipment details, removing and refitting components and attachments, settings, functional tests etc.
		4.2	Describe the different types of machines to be configured: – eg dozers, batching plants, ancillary equipment, cranes, hoists, material handling equipment etc.
		4.3	Explain the requirements for safe systems of work.
		4.4	Describe the methods used to carry out safety, functional and operational checks to plant and equipment: – eg visual checks, function checks of safety devices, operating plant and equipment to performance requirements.
5	Be able to carry out completion activities on conclusion of configuration of plant and equipment.	5.1	Complete all documentation in accordance with the given specifications.

Learning outcomes		Assessment criteria	
6	Know how to carry out completion activities on conclusion of configuration of plant and equipment.	6.1	Describe the different types of documentation used including statutory requirements.

Unit content

1 **Prepare to configure plant and equipment**

Sources of information: manufacturers' manuals eg correct settings, operating requirements; installation guidelines, bulletins, method statements etc

Health and safety: legislation; regulations; codes of practice; safe working practices and procedures

2 **Configure plant and equipment**

Configuration methods and techniques: procedures; practices; identify job requirements, specific machine, equipment details, removing, replacing and refitting components; attachments, positioning, settings etc

Types of machines: eg dozers, batching plants, ancillary equipment, cranes, hoists, material handling equipment etc

Checks: safety; functional; operational eg visual checks, function checks of safety devices, operational parameters

3 **Completion activities on conclusion of configuration of plant and equipment**

Documentation: types; statutory requirements; specification specific

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of procedures to configure plant and equipment. Learners need to know and understand:

- how to prepare to configure plant and equipment.
- how to configure plant and equipment
- completion activities on conclusion of configuration of plant and equipment.

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of procedures to configure plant and equipment.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of procedures to configure plant and equipment. Guest speakers could deliver presentations to learners. For example, a mechanic from a construction organisation could give a presentation on configuration methods and techniques. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 10: Installation and Handover Procedures for Plant and Equipment

Unit code: T/601/9271

QCF Level: 2

Credit value: 3

Guided learning hours: 30

Unit aim

The aim of this unit is to enable learners to acquire the skills and knowledge required to be able to install and handover plant and equipment for safe use including preparation procedures and final documentation.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to install and handover plant and equipment.	1.1	Identify installation requirements from manufacturers' manuals, drawings, customer/client.
		1.2	Check and prepare the installation area for suitability.
2	Know how to prepare to install and handover plant and equipment.	2.1	Describe the health and safety legislation, regulations, Codes of Practice and safe working practices and procedures used when installing plant and equipment.
		2.2	Describe the requirements for working at height, in confined spaces and underground.
		2.3	Describe the sources and types of information used for the installation of plant and equipment: – eg manufacturers' manuals, parts lists, drawings, bulletins, job/site requirements etc.

Learning outcomes		Assessment criteria	
		2.4	Describe the requirements for method statements, risk assessments and safe systems of work.
		2.5	Describe the procedures for liaising with site personnel, clients/hirers regarding installation requirements.
3	Be able to install plant and equipment.	3.1	Install, position and secure plant and equipment to the given specifications.
		3.2	Identify and make all necessary connections.
		3.3	Ensure that the installation has been carried out fully and correctly and meets with relevant safety requirements.
4	Know how to install plant and equipment.	4.1	Describe the different types of plant and equipment to be installed: – eg cranes, hoists, crushers, generators, compressors, power units, batching plants etc.
		4.2	Describe the methods and techniques used to install plant and equipment: – eg drilling and fixing, tying to structures, securing, rigging, levelling, making connections, routeing services, erecting etc.
		4.3	Describe the power supply requirements for installed plant and equipment: – eg self powered, electricity etc.
		4.4	Describe the types of damage and defects associated with installation activities and the procedures for dealing with them: – eg misalignment, leaks, breakages etc.
		4.5	Describe the requirements for the use of handling and lifting equipment for installation purposes.
5	Be able to handover plant and equipment.	5.1	Identify correct requirements and procedures and handover plant and equipment to the end user.

Learning outcomes		Assessment criteria	
6	Know how to handover plant and equipment.	6.1	Describe the requirements and procedures for handing over installed plant and equipment: – eg demonstration of controls, safety checks, servicing requirements, personal protective equipment (PPE) requirements etc.
		6.2	Describe the different types of documentation used including statutory requirements: – eg test certification, service history, risk assessments, method statements.
		6.3	Describe the different types of recording documentation and procedures associated with the installation and handover of plant and equipment.

Unit content

1 **Prepare to install and handover plant and equipment**

Installation requirements: manufacturers' manuals; drawings for customer/client; liaising with site personnel, clients/hirers

Installation area: eg suitability; health and safety legislation; regulations; Codes of Practice; method statements; risk assessments; safe systems of work

Safe working practices and procedures: working at height; in confined spaces; underground

Information: sources; types eg manufacturers' manuals, parts lists, drawings, bulletins, job/site requirements etc

2 **Install plant and equipment**

Plant and equipment: eg cranes, hoists, crushers, generators, compressors, power units, batching plants etc; connections; install; position; secure; safety requirements

Methods and techniques: eg drilling and fixing, tying to structures, securing, rigging, levelling, making connections, routeing services, erecting etc; handling; lifting

Power supply requirements: eg self-powered, electricity etc

Damage and defects: eg misalignment, leaks, breakages etc

3 **Handover of plant and equipment**

Handing over: procedures eg demonstration of controls, safety checks, servicing requirements, personal protective equipment (PPE) requirements etc.

Documentation: types; statutory requirements eg test certification, service history, risk assessments, method statements.

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of installation and handover procedures for plant and equipment. Learners need to know and understand:

- how to prepare to install and handover plant and equipment
- installation of plant and equipment
- how to handover plant and equipment

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of installing and handing over plant and equipment. Tutors could record feedback from individual groups on a flipchart or Whiteboard.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of handing over of plant and equipment**.** Guest speakers could deliver presentations to learners. For example, a plant supervisor from a construction organisation could give a presentation on safe working practices and procedures. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Unit 11: Dismantle, Assess and Assemble Plant and Equipment Components

Unit code: D/601/9250

QCF Level: 2

Credit value: 7

Guided learning hours: 66

Unit aim

The aim of this unit is to enable learners to acquire the skills and knowledge required to dismantle, assess and assemble plant and equipment components to specification including functional checks during reassembly and on completion.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning outcomes		Assessment criteria	
1	Be able to prepare to dismantle plant and equipment components.	1.1	Identify and prepare plant and equipment components for dismantling.
		1.2	Interpret and extract information relating to the dismantling and re-assembly of components and assemblies.
2	Know how to prepare to dismantle plant and equipment components.	2.1	Describe the types of information sources used when repairing plant components: – eg workshop manuals, parts lists, stores requisition forms, manufacturers' data etc.
3	Be able to dismantle plant and equipment components.	3.1	Dismantle unserviceable components and prepare parts for measurement/comparison in accordance with manufacturers' specifications

Learning outcomes		Assessment criteria	
4	Know how to dismantle plant and equipment components.	4.1	Describe specified component parts, design features and the functions of: – eg sliding mesh and constant mesh gearboxes, two and four-stroke engines, axles, prop shafts, clutches and final drives.
		4.2	Describe the types of component parts to be disassembled: – eg bearings, gears, seals, keys, springs, pins, retaining devices, shafts, electrical/electronic devices etc.
		4.3	Describe the methods used to dismantle components: – eg fastenings, plugs, pins and shaft removal etc.
5	Be able to examine and assess plant and equipment components accurately.	5.1	Examine, measure and compare component parts for re-use or replacement.
		5.2	Use measuring and comparator equipment to calculate measurements and quantities: – eg micrometer, vernier, rules, plug gauges, straight edges, surface plates, vee blocks etc.
		5.3	Identify measurements, tolerances and fit from manufacturers' instructions.
		5.4	Produce parts lists and tables of results to meet with requirements.
6	Know how to examine and assess plant and equipment components accurately.	6.1	Describe the types of component parts to be measured and compared: – eg shafts, bearings, gears, spacers, seals, cylinders, bores, shims, belts, electrical devices etc.
		6.2	Describe the different tools and their uses for measuring and comparing component parts: – eg micrometer, vernier, callipers, rules, bore gauges, dial gauges, feeler gauges, plug gauges, ring gauges, new component parts etc.

Learning outcomes		Assessment criteria	
		6.3	Describe the care requirements and methods and techniques for using measuring and comparing tools and equipment.
		6.4	Describe the calculations required to evaluate measurement results, and the meaning and calculation of limits, fits and tolerances.
		6.5	Describe the types of defects that could occur with: – eg shafts, seals, gears, housings etc.
7	Be able to re-assemble plant and equipment components.	7.1	Re-assemble components in accordance with manufacturers' specifications.
		7.2	Carry out bench and in-situ functional tests to ensure assembled components operate in accordance with manufacturers' specifications.
8	Know how to re-assemble plant and equipment components.	8.1	Describe the meaning and methods of establishing end-float, backlash and pre-load.
		8.2	Explain how to set and use torque spanners and torque multipliers.
		8.3	Describe the methods used to cut gaskets, shims and remove fit bearings and seals.
		8.4	Describe the methods and procedures to assemble components:- eg drifts, presses, retainers, shimming, adhesives etc.
		8.5	Describe the procedures for obtaining new/replacement parts.
		8.6	Describe the methods of checking assembled component parts function, during and after assembly has been completed.
		8.7	Describe the types and uses of recording and reporting documentation.

Unit content

1 **Prepare to dismantle plant and equipment components**

Information: specifications eg for dismantling, for reassembly; sources eg workshop manuals, parts lists, stores requisition forms, manufacturers' data etc

2 **Dismantle plant and equipment components**

Component parts: design features; functions eg sliding mesh and constant mesh gearboxes, two-and four-stroke engines, axles, prop shafts, clutches; final drives; types eg bearings, gears, seals, keys, springs, pins, retaining devices, shafts, electrical/electronic devices; methods to dismantle eg fastenings, plugs, pins and shaft removal

3 **Examine and assess plant and equipment components accurately**

Measuring and comparing: measuring and comparator equipment eg micrometer, vernier, rules, plug gauges, straight edges, surface plates, vee blocks; parts for measuring eg shafts, bearings, gears, spacers, seals, cylinders, bores, shims, belts, electrical devices; measuring tools eg micrometer, vernier, callipers, rules, bore gauges, dial gauges, feeler gauges, plug gauges, ring gauges, new component parts; methods; techniques

Assessing: measurements; calculations; tolerances; fit; limits; parts lists; results tables; defects eg to shafts, seals, gears, housings

4 **Re-assemble plant and equipment components**

Reassembly procedures: manufacturer's specification; functional tests; operation eg end-float, backlash and pre-load; torque; cutting; fitting; obtaining new parts

Reassembly methods: eg drifts, presses, retainers, shimming, adhesives

Documentation: recording information eg types; reporting information eg uses

Essential guidance for tutors

Delivery

This unit should be delivered so that it enables learners to develop their knowledge and understanding of dismantling, assessing and assembling plant and equipment components. Learners need to know and understand:

- how to prepare to dismantle plant and equipment components.
- how to dismantle plant and equipment components
- how to examine and assess plant and equipment components accurately.
- How to re-assemble plant and equipment components

Health, safety and welfare are paramount and must be strictly enforced through close supervision of all workshops and activity areas. Risk assessments must be undertaken before any practical activities take place.

Small-group discussions could be used to introduce the unit. This would give learners an opportunity to swap ideas and exchange their experiences of dismantling, assessing and assembling plant and equipment components.

By engaging with employers and employees learners will gain more from their learning experience. It will also help demonstrate the unit's vocational relevance and currency and develop knowledge and understanding of dismantling, assessing and assembling plant and equipment components. Guest speakers could deliver presentations to learners. For example, a fitter from a construction plant could give a presentation on measuring and comparing equipment. This could be supported with examples drawn from industry, perhaps in the form of a set of case studies.

Audio visual training programmes can also be used.

Assessment

A variety of assessment methods can be used. Learners could produce written reports or give verbal presentations, supported by witness testimony. Alternatively, learners could produce logbooks or workbooks completed in the workplace or during visits to industry.

Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the assessment criteria. Centres are encouraged to emphasise the practical application of the assessment criteria.

Further information

For further information please call Customer Services on 0844 576 0026 (calls may be recorded for training purposes) or visit our website (www.edexcel.com).

Useful publications

Related information and publications include:

- *Guidance for Centres Offering Edexcel/BTEC QCF Accredited Programmes* (Edexcel, distributed to centres annually)
- Functional skills publications – specifications, tutor support materials and question papers
- *Regulatory arrangements for the Qualification and Credit Framework* (published by Ofqual) August 2008
- current Edexcel publications catalogue and update catalogue.

Edexcel publications concerning the Quality Assurance System and the internal and external verification of vocationally related programmes can be found on the Edexcel website and in the Edexcel publications catalogue.

NB: Some of our publications are priced. There is also a charge for postage and packing. Please check the cost when you order.

How to obtain National Occupational Standards

ConstructionSkills

Bircham Newton
Kings Lynn
Norfolk
PE31 6RH

Tel: 0344 994 4400
Fax: 01485 577793

Professional development and training

Edexcel supports UK and international customers with training related to BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building functional skills into your programme
- building in effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on our website (www.edexcel.com/training). You can request customised training through the website or by contacting one of our advisers in the Training from Edexcel team via Customer Services to discuss your training needs.

Our customer service numbers are:

BTEC and NVQ	0844 576 0026
GCSE	0844 576 0027
GCE	0844 576 0025
The Diploma	0844 576 0028
DiDA and other qualifications	0844 576 0031

Calls may be recorded for training purposes.

The training we provide:

- is active – ideas are developed and applied
- is designed to be supportive and thought provoking
- builds on best practice.

Our training is underpinned by the LSIS standards for those preparing to teach and for those seeking evidence for their continuing professional development.

Annexe A

The Edexcel/BTEC qualification framework for the building and construction sector

Progression opportunities within the framework.

Level	General qualifications	BTEC full vocationally-related qualifications	BTEC specialist courses	NVQ/occupational
8				
7				
6				
5		Edexcel BTEC Level 5 Higher National Diploma in Construction		
4		Edexcel BTEC Level 4 Higher National Certificate in Construction Edexcel BTEC Level 4 Higher National Certificate in Building Services Engineering Edexcel BTEC Level 4 Higher National Certificate in Civil Engineering		

Level	General qualifications	BTEC full vocationally-related qualifications	BTEC specialist courses	NVQ/occupational
3		Edexcel BTEC Certificate, Subsidiary Diploma, Diploma and Extended Diploma in Construction and the Built Environment	Edexcel BTEC Level 3 Diploma in Construction Occupations (QCF)	
2	GCSE in Construction and the Built Environment	Edexcel BTEC Level 2 Certificate/Extended Certificate/Diploma in Construction	Edexcel BTEC level 2 Diploma in Plant Maintenance (QCF)	
1		Edexcel BTEC Level 1 Diploma in Construction Edexcel BTEC Level 1 Extended Certificate in Construction Edexcel BTEC Level 1 Certificate in Construction		
Entry		Edexcel BTEC Entry Level 3 Award in Construction		

Annexe B

Wider curriculum mapping

Edexcel BTEC Level 2 qualifications give learners opportunities to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of citizenship, environmental issues, European developments, health and safety considerations and equal opportunities issues.

Spiritual, moral, ethical, social and cultural issues

Throughout the delivery of these qualifications learners will have the opportunity to actively participate in different kinds of decision making. They will have to consider fair and unfair situations and explore how to resolve conflict. Working in small groups they will learn how to respect and value others' beliefs, backgrounds and traditions.

Citizenship

Learners undertaking these qualifications will have the opportunity to develop their understanding of citizenship issues.

Environmental issues

Developing a responsible attitude towards the care of the environment is an integral part of this qualification. Learners are encouraged to minimise waste and discuss controversial issues.

European developments

Much of the content of the qualification applies throughout Europe, even though the delivery is in a UK context.

Health and safety considerations

Health and safety is embedded within many of the units in this qualification. Learners will consider their own health and safety at work, how to identify risks and hazards and how to minimise those risks.

Equal opportunities issues

There will be opportunities throughout this qualification to explore different kinds or rights and how these affect both individuals and communities, for example learners will consider their rights at work and the rights of employers and how these rights affect the work community.

Annexe C

National Occupational Standards/mapping with NOS

The grid below maps the knowledge covered in the Edexcel BTEC Level 2 Specialist qualifications in Plant Maintenance against the underpinning knowledge of the Level 2 National Occupational Standards in Plant Maintenance.

KEY

\# indicates partial coverage of the NVQ unit

a blank space indicates no coverage of the underpinning knowledge

NOS/Units	1	2	3	4	5	6	7	8	9	10	11
PM 08 Maintain the Work Area	✓										
PM 05 Carry Out Servicing and Maintenance of Plant and Equipment		✓									
PM 06 Remove and Replace Plant Equipment Components.			✓	✓							
PM 07 Dismantle and Assemble Plant and Equipment Components.											✓
PM 11 Repair Plant and Equipment for Operational Serviceability					✓						
PM 12 Produce One-off Components to Assist Plant and Equipment Activities.					✓						
PM 09 Inspect Plant and Equipment for Operational Serviceability						✓					
PM 10 Diagnose Faults in Plant and Equipment Systems and Components						✓					
PM 15 Carry Out Specific Tests on Plant and Equipment.							✓				
PM 13 Move Standard Loads								✓			
PM 16 Configure Plant and Equipment for Operational Activities									✓		
PM 14 Install Plant and Equipment for Operational Activities.										✓	
PM 23 Handover Plant and Equipment to the Control of Others										✓	

Annexe D

Mapping to Level 1 Functional Skills

Level 1	Unit number										
English – Speaking, Listening and Communication	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Take full part in formal and informal discussions and exchanges that include unfamiliar subjects	✓			✓		✓	✓			✓	
English – Reading											
Read and understand a range of straightforward texts		✓				✓			✓	✓	✓
English – Writing											
Write a range of texts to communicate information, ideas and opinions, using formats and styles suitable for their purpose and audience							✓	✓	✓		✓

Level 1	Unit number										
Mathematics – representing	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Understand practical problems in familiar and unfamiliar contexts and situations, some of which are non-routine			✓								✓
Identify and obtain necessary information to tackle the problem					✓	✓		✓			✓
Select mathematics in an organised way to find solutions			✓		✓			✓			
Mathematics - analysing											
Apply mathematics in an organised way to find solutions to straightforward practical problems for different purposes			✓				✓				✓
Use appropriate checking procedures at each stage										✓	✓

Mathematics - interpreting											
Interpret and communicate solutions to practical problems, drawing simple conclusions and giving explanations			✓				✓		✓		✓

Annexe E

Glossary of accreditation terminology

Accreditation start/end date	The first/last dates that Edexcel can register learners for a qualification.
Certification end date	The last date on which a certificate may be issued by Edexcel.
Credit value	All units have a credit value. The minimum credit value that may be determined for a unit is one, and credits can only be awarded in whole numbers. Learners will be awarded credits for the successful completion of whole units.
Guided Learning Hours (GLH)	Guided learning hours are defined as all the times when a tutor, trainer or facilitator is present to give specific guidance towards the learning aim being studied on a programme. This definition includes lectures, tutorials and supervised study in, for example, open learning centres and learning workshops. It also includes time spent by staff assessing learners' achievements. It does not include time spent by staff in day-to-day marking of assignments or homework where the learner is not present.
Learning Aims Database	Link to the Learning Aims Database, which features detailed funding information by specific learning aim reference.
Learning Aim Reference	Unique reference number given to the qualification by the funding authorities on accreditation.
Level	The level at which the qualification is positioned in the Qualifications and Credit Framework (QCF).
Performance tables	This/these qualifications is/are listed on the Department for Education (DfE) website School and College Achievement and Attainment Tables (SCAAT) as performance indicators for schools and colleges.
Qualifications Accreditation Number (QN)	Unique reference number given to the qualification by the regulatory authorities on accreditation.
Register of Regulated Qualifications	Link to the entry on the Register of Regulated Qualifications for a particular qualification. This database features detailed accreditation information for the particular qualification.

Section 96	Section 96 is a section of the Learning and Skills Act 2000. This shows for which age ranges the qualification is publicly funded for under-19 learners.
Title	The accredited title of the qualification.
UCAS points	This/these qualification(s) is/are listed on the Universities and Colleges Admissions Service (UCAS) tariff for those wishing to progress to higher education.

Annexe F

BTEC Specialist and Professional qualifications

BTEC qualifications on the NQF	Level	BTEC Specialist and Professional Qualifications on the QCF	BTEC qualification suites on the QCF
BTEC Level 7 Advanced Professional Qualifications BTEC Advanced Professional Award, Certificate and Diploma	7	**BTEC Level 7 Professional Qualifications** BTEC Level 7 Award, Certificate, Extended Certificate and Diploma	
BTEC Level 6 Professional Qualifications BTEC Professional Award, Certificate and Diploma	6	**BTEC Level 6 Professional Qualifications** BTEC Level 6 Award, Certificate, Extended Certificate and Diploma	
BTEC Level 5 Professional Qualifications BTEC Professional Award, Certificate and Diploma	5	**BTEC Level 5 Professional Qualifications** BTEC Level 5 Award, Certificate, Extended Certificate and Diploma	**BTEC Level 5 Higher Nationals** BTEC Level 5 HND Diploma
BTEC Level 4 Professional Qualifications BTEC Professional Award, Certificate and Diploma	4	**BTEC Level 4 Professional Qualifications** BTEC Level 4 Award, Certificate, Extended Certificate and Diploma	**BTEC Level 4 Higher Nationals** BTEC Level 4 HNC Diploma
BTEC Level 3 Qualifications BTEC Award, Certificate, Extended Certificate and Diploma	3	**BTEC Level 3 Specialist Qualifications** BTEC Level 3 Award, Certificate, Extended Certificate and Diploma	**BTEC Level 3 Nationals** BTEC Level 3 Certificate, Subsidiary Diploma, Diploma and Extended Diploma

BTEC qualifications on the NQF	Level	BTEC Specialist and Professional Qualifications on the QCF	BTEC qualification suites on the QCF
BTEC Level 2 Qualifications BTEC Award, Certificate, Extended Certificate and Diploma	2	**BTEC Level 2 Specialist Qualifications** BTEC Level 2 Award, Certificate, Extended Certificate and Diploma	**BTEC Level 2 Firsts** BTEC Level 2 Certificate, Extended Certificate and Diploma
BTEC Level 1 Qualifications BTEC Award, Certificate, Extended Certificate and Diploma	1	**BTEC Level 1 Specialist Qualifications** BTEC Level 1 Award, Certificate, Extended Certificate and Diploma	**BTEC Level 1 Qualifications** BTEC Level 1 Award, Certificate and Diploma (vocational component of Foundation Learning)
	E	**BTEC Entry Level Specialist Qualifications** BTEC Entry Level Award, Certificate, Extended Certificate and Diploma	**BTEC Entry Level Qualifications (E3)** BTEC Entry Level 3 Award, Certificate and Diploma (vocational component of Foundation Learning)

NQF = National Qualifications Framework

QCF = Qualifications and Credit Framework

For most qualifications on the **NQF**, the accreditation end date is normally 31 August 2010 or 31 December 2010.

For qualifications on the **QCF**, the accreditation start date is usually 1 September 2010 or 1 January 2011.

QCF qualification sizes	
Award	1-12 credits
Certificate	13-36 credits
Diploma	37+ credits

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