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Pearson Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations

Specification

Competence-based qualification

For first registration November 2011

Issue 3

Pearson

Edexcel, BTEC and LCCI qualifications

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This specification is Issue 3. Key changes are listed in the summary table on the next page. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson website: qualifications.pearson.com

This/ese qualification(s) was/were previously known as:

Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations

The QN(s) remain(s) the same.

ISBN 9781446953587

Summary of Pearson Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations Issue 3 changes

Summary of changes made between previous issue and this current issue	Page number
All references to QCF have been removed throughout the specification	
Definition of TQT added	1
Definition of sizes of qualifications aligned to TQT	2
TQT value added	6
Reference to credit transfer within the QCF removed	21
QCF references removed from unit titles and unit levels in all units	24-106

Earlier issue(s) show(s) previous changes.
If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

Contents

Introducing Pearson Edexcel NVQ qualifications

What are NVQ qualifications?

National Vocational Qualifications (NVQs) are work-based qualifications that give learners the opportunity to develop and demonstrate their competence in the area of work or job role to which the qualification relates.

NVQs are based on the National Occupational Standards (NOS) for the appropriate sector. NOS define what employees, or potential employees, must be able to do and know, and how well they should undertake work tasks and work roles. At Level 2 and above, these qualifications are recognised as the competence component of Apprenticeship Frameworks. Qualifications at Level 1 can be used in Traineeships, which are stepping-stones to Apprenticeship qualifications. NVQs qualifications can also be delivered as stand-alone for those who wish to take a work-based qualification.

NVQs qualifications are outcomes-based with no fixed learning programme – allowing flexible delivery that meets the individual learner's needs. They are suitable for those in employment or those who are studying at college and have a part-time job or access to a substantial work placement so that they are able to demonstrate the competencies that are required for work.

Most learners will work towards their qualification in the workplace or in settings that replicate the working environment as specified in the assessment requirements/strategy for the sector. Colleges, training centres and/or employers can offer these qualifications provided they have access to appropriate physical and human resources.

Sizes of NVQ/Competence-based qualifications

For all regulated qualifications, Pearson specify a total number of hours that is estimated learners will require to complete and show achievement for the qualification – this is the Total Qualification Time (TQT). The TQT value indicates the size of a qualification.
Within the TQT, Pearson identifies the number of Guided Learning Hours (GLH) that we estimate a centre delivering the qualification might provide. Guided learning means activities, such as lessons, tutorials, online instruction, supervised study and giving feedback on performance, that directly involve tutors and assessors in teaching, supervising and invigilating learners. Guided learning includes the time required for learners to complete external assessment under examination or supervised conditions.
In addition to guided learning, other required learning directed by tutors or assessors will include private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.
As well as TQT and GLH, qualifications can also have a credit value – equal to one tenth of TQT, rounded to the nearest whole number.
TQT and credit values are assigned after consultation with users of the qualifications.

NVQ/Competence-based qualifications are available in the following sizes:

- Award – a qualification with a TQT value of 120 or less (equivalent to a range of 1–12 credits)
- Certificate – a qualification with a TQT value in the range of 121–369 (equivalent to a range of 13–36 credits)
- Diploma – a qualification with a TQT value of 370 or more (equivalent to 37 credits and above).

Qualification title covered by this specification

This specification gives you the information you need to offer the Pearson Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations:

Qualification title	Qualification Number (QN)	Accreditation start date
Pearson Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations	600/3577/8	01/11/11

You should use the Qualification Number (QN), when you wish to seek public funding for your learners. Each unit within a qualification will also have a unique reference number, which is listed in this specification.

The qualification title and unit reference numbers will appear on the learners' final certification document. Learners need to be made aware of this when they are recruited by the centre and registered with Pearson.

Key features of the Pearson Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations

This qualification:

- is nationally recognised
- is based on the Land-based Engineering Operations National Occupational Standards (NOS). The NOS and qualification structure(s) are owned by Lantra SSC.

The Pearson Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations will be approved as a component for the Land-based Engineering Apprenticeship framework.

What is the purpose of this qualification?

This qualification is appropriate for employees in the land-based engineering sector. They are designed to assess occupational competence in the workplace where learners are required to demonstrate skills and knowledge to a level required in land-based engineering industries.

Who is this qualification for?

This qualification is for all learners aged 14 and above who are capable of reaching the required standards.

Pearson's policy is that the qualification should:

- be free from any barriers that restrict access and progression
- ensure equality of opportunity for all wishing to access the qualification.

What are the benefits of this qualification to the learner and employer?

This qualification allows learners to demonstrate competence against the NOS based on the needs of the land-based engineering sector as defined by Lantra SSC. The qualification contributes to the development of skilled labour in the sector.

What are the potential job roles for those working towards this qualification?

- Land-based vehicle maintenance assistant
- Land-based vehicle diagnostic assistant
- Land-based workshop assistant
- Land-based mechanical assistant

What progression opportunities are available to learners who achieve this qualification?

Learners can progress across the level and size of the land-based engineering competence and knowledge qualifications and into other occupational areas such as vehicle maintenance, equipment maintenance and land-based technology.

What is the qualification structure for the Pearson Edexcel Level 2 Diploma in Work-based Land-based Engineering Operations?

The Total Qualification Time (TQT) for this qualification is 1090.

The Guided Learning Hours for this qualification are 780.

All learners for the Agriculture, Arboriculture/Forestry and Ground Care pathways must complete all mandatory units plus four units from Group A and two units from Group B to give a minimum of 109 credits.

For those completing Fixed Plant pathway learners must complete all mandatory units and a minimum of 15 credits from the optional units to give a minimum of 119 credits.

Agriculture pathway

Learners must complete all mandatory units.

Mandatory units				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
1	R/601/5311	Monitor and Maintain Health and Safety in a Land-based Engineering Work Area	10	2
2	L/600/3433	Land-based Engineering Operations – Applying Mechanical Principles	5	2
3	R/600/3434	Land-based Engineering Operations – Understand how to Use, Service and Maintain Tools and Equipment	5	2
4	F/600/3431	Land-based Engineering Operations – Material Preparation, Shaping and Assembling	10	2
5	F/600/3428	Land-based Engineering Operations – Carry out Servicing and Maintenance on Land-based Equipment	10	2
6	A/600/3427	Land-based Engineering Operations – Perform Thermal Joining and Cutting Processes	10	2

Mandatory units				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
7	T/600/3426	Land-based Engineering Operations – Service and Repair Cooling and Lubrication Systems	**5**	**2**
8	Y/600/3404	Service and Repair Electrical Systems on Land-based Equipment	**10**	**2**
9	L/600/3402	Service and Repair Hydraulic Systems and Components on Land-based Equipment	**10**	**2**
10	F/502/1689	Maintain and Develop Personal Performance	**2**	**2**
11	T/502/1690	Establish and Maintain Effective Working Relationships with Others	**2**	**2**

Learners must complete four units from Group A.

Group A				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
12	K/600/3424	Land-based Engineering Operations – Service and Repair Engines and Components	**10**	**2**
13	H/600/3423	Service and Repair Clutches, Fluid Flywheels and Torque Converters on Land-based Equipment	**5**	**2**
14	Y/600/3421	Service and Repair Mechanical Transmissions on Land-based Equipment	**10**	**2**
15	R/600/3420	Service and Repair Braking Systems on Land-based Equipment	**5**	**2**

Group A				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
16	D/600/3419	Service and Repair Wheeled and Tracked Steering Systems on Land-based Equipment	**5**	**2**
17	K/600/3410	Service and Repair Tyres and Tracks on Land-based Equipment	**5**	**2**

Learners must complete two units from Group B.

Group B				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
18	T/600/3409	Service and Repair Land-based Cutting and Mowing Equipment	**5**	**2**
19	M/600/3408	Service and Repair Land-based Harvesting and Processing Equipment	**10**	**2**
20	K/600/3407	Service and Repair Land-based Soil Preparation and Plant Establishment Equipment	**10**	**2**
21	H/600/3406	Service and Repair Land-based Transport Handling and Storage Equipment	**10**	**2**
22	J/600/3401	Service and Repair Pneumatic Systems and Components for Land-based Equipment	**5**	**2**

Arboriculture/Forestry pathway

Learners must complete all mandatory units.

Mandatory units				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
1	R/601/5311	Monitor and Maintain Health and Safety in a Land-based Engineering Work Area	**10**	**2**
2	L/600/3433	Land-based Engineering Operations – Applying Mechanical Principles	**5**	**2**

Mandatory units				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
3	R/600/3434	Land-based Engineering Operations – Understand how to Use, Service and Maintain Tools and Equipment	**5**	**2**
4	F/600/3431	Land-based Engineering Operations – Material Preparation, Shaping and Assembling	**10**	**2**
5	F/600/3428	Land-based Engineering Operations – Carry out Servicing and Maintenance on Land-based Equipment	**10**	**2**
6	A/600/3427	Land-based Engineering Operations – Perform Thermal Joining and Cutting Processes	**10**	**2**
7	T/600/3426	Land-based Engineering Operations – Service and Repair Cooling and Lubrication Systems	**5**	**2**
8	Y/600/3404	Service and Repair Electrical Systems on Land-based Equipment	**10**	**2**
9	L/600/3402	Service and Repair Hydraulic Systems and Components on Land-based Equipment	**10**	**2**
10	F/502/1689	Maintain and Develop Personal Performance	**2**	**2**
11	T/502/1690	Establish and Maintain Effective Working Relationships with Others	**2**	**2**

Learners must complete four units from Group A.

Group A				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
12	K/600/3424	Land-based Engineering Operations – Service and Repair Engines and Components	**10**	**2**
13	H/600/3423	Service and Repair Clutches, Fluid Flywheels and Torque Converters on Land-based Equipment	**5**	**2**
14	Y/600/3421	Service and Repair Mechanical Transmissions on Land-based Equipment	**10**	**2**
15	R/600/3420	Service and Repair Braking Systems on Land-based Equipment	**5**	**2**
16	D/600/3419	Service and Repair Wheeled and Tracked Steering Systems on Land-based Equipment	**5**	**2**
17	K/600/3410	Service and Repair Tyres and Tracks on Land-based Equipment	**5**	**2**

Learners must complete two units from Group B.

Group B				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
18	T/600/3409	Service and Repair Land-based Cutting and Mowing Equipment	**5**	**2**
19	M/600/3408	Service and Repair Land-based Harvesting and Processing Equipment	**10**	**2**
20	K/600/3407	Service and Repair Land-based Soil Preparation and Plant Establishment Equipment	**10**	**2**
21	H/600/3406	Service and Repair Land-based Transport Handling and Storage Equipment	**10**	**2**
22	J/600/3401	Service and Repair Pneumatic Systems and Components for Land-based Equipment	**5**	**2**

Ground Care Pathway

Learners must complete all mandatory units.

Mandatory units				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
1	R/601/5311	Monitor and Maintain Health and Safety in a Land-based Engineering Work Area	**10**	**2**
2	L/600/3433	Land-based Engineering Operations – Applying Mechanical Principles	**5**	**2**
3	R/600/3434	Land-based Engineering Operations – Understand how to Use, Service and Maintain Tools and Equipment	**5**	**2**
4	F/600/3431	Land-based Engineering Operations – Material Preparation, Shaping and Assembling	**10**	**2**
5	F/600/3428	Land-based Engineering Operations – Carry out Servicing and Maintenance on Land-based Equipment	**10**	**2**
6	A/600/3427	Land-based Engineering Operations – Perform Thermal Joining and Cutting Processes	**10**	**2**
7	T/600/3426	Land-based Engineering Operations – Service and Repair Cooling and Lubrication Systems	**5**	**2**
8	Y/600/3404	Service and Repair Electrical Systems on Land-based Equipment	**10**	**2**
9	L/600/3402	Service and Repair Hydraulic Systems and Components on Land-based Equipment	**10**	**2**
10	F/502/1689	Maintain and Develop Personal Performance	**2**	**2**
11	T/502/1690	Establish and Maintain Effective Working Relationships with Others	**2**	**2**

Learners must complete four units from Group A.

Group A				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
12	K/600/3424	Land-based Engineering Operations – Service and Repair Engines and Components	**10**	**2**
13	H/600/3423	Service and Repair Clutches, Fluid Flywheels and Torque Converters on Land-based Equipment	**5**	**2**
14	Y/600/3421	Service and Repair Mechanical Transmissions on Land-based Equipment	**10**	**2**
15	R/600/3420	Service and Repair Braking Systems on Land-based Equipment	**5**	**2**
16	D/600/3419	Service and Repair Wheeled and Tracked Steering Systems on Land-based Equipment	**5**	**2**
17	K/600/3410	Service and Repair Tyres and Tracks on Land-based Equipment	**5**	**2**

Learners must complete two from Group B.

Group B				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
18	T/600/3409	Service and Repair Land-based Cutting and Mowing Equipment	**5**	**2**
19	M/600/3408	Service and Repair Land-based Harvesting and Processing Equipment	**10**	**2**
20	K/600/3407	Service and Repair Land-based Soil Preparation and Plant Establishment Equipment	**10**	**2**

Group B				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
21	H/600/3406	Service and Repair Land-based Transport Handling and Storage Equipment	**10**	**2**
22	J/600/3401	Service and Repair Pneumatic Systems and Components for Land-based Equipment	**5**	**2**

Fixed Plant and Storage pathway

Learners must complete all mandatory units.

Mandatory units				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
1	R/601/5311	Monitor and Maintain Health and Safety in a Land-based Engineering Work Area	**10**	**2**
2	L/600/3433	Land-based Engineering Operations – Applying Mechanical Principles	**5**	**2**
3	R/600/3434	Land-based Engineering Operations – Understand how to Use, Service and Maintain Tools and Equipment	**5**	**2**
4	F/600/3431	Land-based Engineering Operations – Material Preparation, Shaping and Assembling	**10**	**2**
5	F/600/3428	Land-based Engineering Operations – Carry out Servicing and Maintenance on Land-based Equipment	**10**	**2**
6	A/600/3427	Land-based Engineering Operations – Perform Thermal Joining and Cutting Processes	**10**	**2**
7	T/600/3426	Land-based Engineering Operations – Service and Repair Cooling and Lubrication Systems	**5**	**2**

Mandatory units				
Unit Number	**Reference Number**	**Unit title**	**Credit**	**Level**
8	Y/600/3404	Service and Repair Electrical Systems on Land-based Equipment	**10**	**2**
9	L/600/3402	Service and Repair Hydraulic Systems and Components on Land-based Equipment	**10**	**2**
10	F/502/1689	Maintain and Develop Personal Performance	**2**	**2**
11	T/502/1690	Establish and Maintain Effective Working Relationships with Others	**2**	**2**
14	Y/600/3421	Service and Repair Mechanical Transmissions on Land-based Equipment	**10**	**2**
21	H/600/3406	Service and Repair Land-based Transport Handling and Storage Equipment	**10**	**2**
22	J/600/3401	Service and Repair Pneumatic Systems and Components for Land-based Equipment	**5**	**2**

Learners must complete a minimum of 15 credits from the optional units.

Optional units				
12	K/600/3424	Land-based Engineering Operations – Service and Repair Engines and Components	**10**	**2**
13	H/600/3423	Service and Repair Clutches, Fluid Flywheels and Torque Converters on Land-based Equipment	**5**	**2**
15	R/600/3420	Service and Repair Braking Systems on Land-based Equipment	**5**	**2**
19	M/600/3408	Service and Repair Land-based Harvesting and Processing Equipment	**10**	**2**

How is the qualification graded and assessed?

The overall grade for the qualification is a 'pass'. The learner must achieve all the required units within the specified qualification structure.

To pass a unit the learner must:

- achieve **all** the specified learning outcomes
- satisfy **all** the assessment criteria by providing sufficient and valid evidence for each criterion
- show that the evidence is their own.

The qualification is designed to be assessed:

- in the workplace, or
- in conditions resembling the workplace, as specified in the assessment requirements/strategy for the sector, or
- as part of a training programme.

Assessment requirements/strategy

Any assessment strategy for units in this qualification is indicated within relevant units.

Evidence of competence may come from:

- **current practice** where evidence is generated from a current job role
- a **programme of development** where evidence comes from assessment opportunities built into a learning/training programme whether at or away from the workplace
- the **Recognition of Prior Learning (RPL)** where a learner can demonstrate that they can meet the assessment criteria within a unit through knowledge, understanding or skills they already possess without undertaking a course of learning. They must submit sufficient, reliable and valid evidence for internal and standards verification purposes. RPL is acceptable for accrediting a unit, several units or a whole qualification
- a **combination** of these.

It is important that the evidence is:

Valid	relevant to the standards for which competence is claimed
Authentic	produced by the learner
Current	sufficiently recent to create confidence that the same skill, understanding or knowledge persist at the time of the claim
Reliable	indicates that the learner can consistently perform at this level
Sufficient	fully meets the requirements of the standards.

Types of evidence

To successfully achieve a unit the learner must gather evidence which shows that they have met the required standard in the assessment criteria. Evidence can take a variety of different forms including the examples below. Centres should refer to the assessment strategy for information about which of the following are permissible:

- direct observation of the learner's performance by their assessor (O)
- outcomes from oral or written questioning (Q&A)
- products of the learner's work (P)
- personal statements and/or reflective accounts (RA)
- outcomes from simulation, where permitted by the assessment strategy (S)
- professional discussion (PD)
- assignment, project/case studies (A)
- authentic statements/witness testimony (WT)
- expert witness testimony (EPW)
- evidence of Recognition of Prior Learning (RPL).

The abbreviations may be used for cross-referencing purposes.

Learners can use one piece of evidence to prove their knowledge, skills and understanding across different assessment criteria and/or across different units. It is, therefore, not necessary for learners to have each assessment criterion assessed separately. Learners should be encouraged to reference the assessment criteria to which the evidence relates.

Evidence must be made available to the assessor, internal verifier and Pearson standards verifier. A range of recording documents is available on the Pearson website (qualifications.pearson.com). Alternatively, centres may develop their own.

Centre recognition and approval

Centre recognition

Centres that have not previously offered Pearson qualifications need to apply for and be granted centre recognition as part of the process for approval to offer individual qualifications. New centres must complete both a centre recognition approval application and a qualification approval application.

Existing centres will be given 'automatic approval' for a new qualification if they are already approved for a qualification that is being replaced by the new qualification and the conditions for automatic approval are met. Centres already holding Pearson approval are able to gain qualification approval for a different level or different sector via Edexcel online.

Approvals agreement

All centres are required to enter into an approvals agreement which is a formal commitment by the head or principal of a centre to meet all the requirements of the specification and any linked codes or regulations. Pearson will act to protect the integrity of the awarding of qualifications, if centres do not comply with the agreement. This could result in the suspension of certification or withdrawal of approval.

Quality assurance

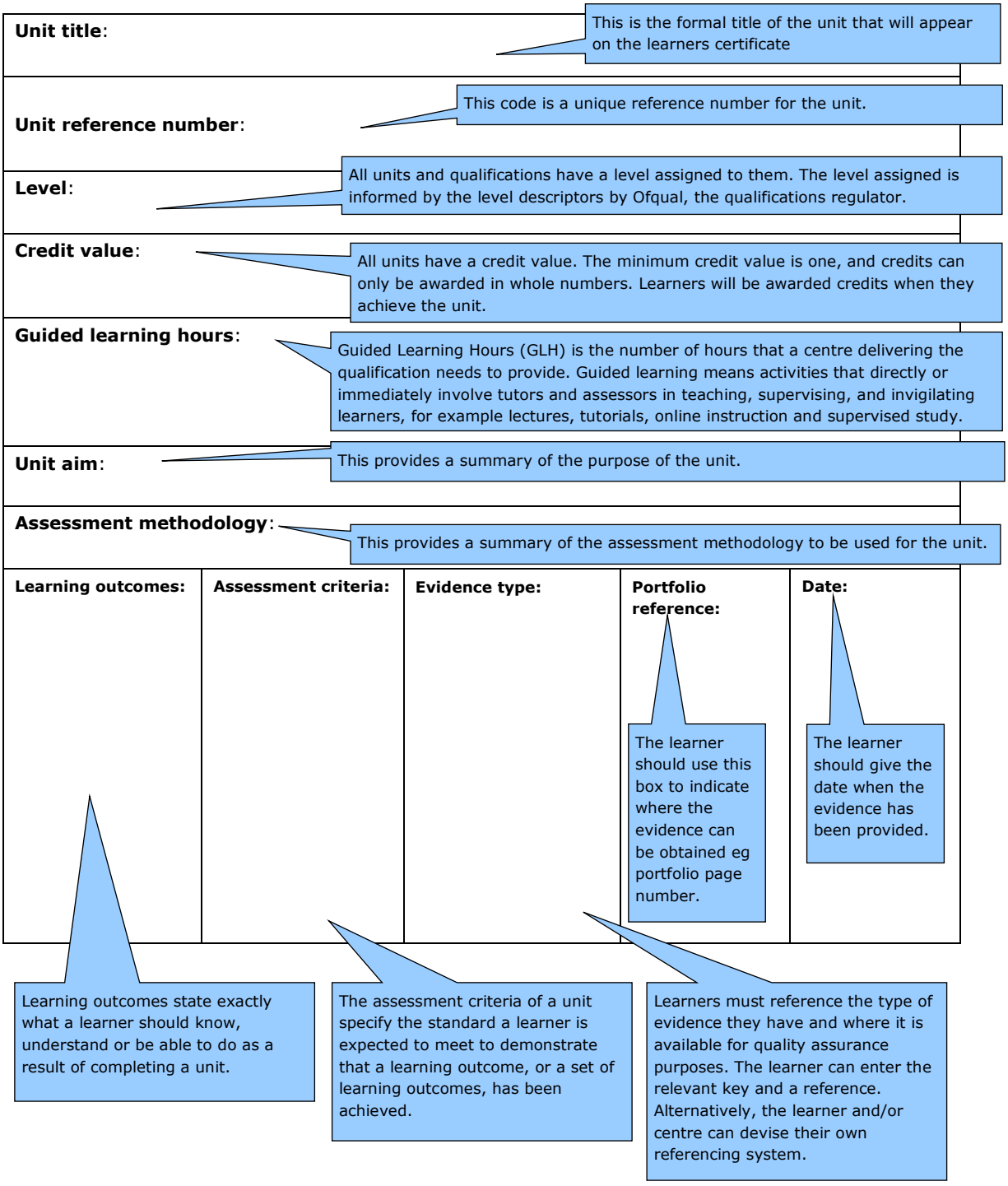
Detailed information on Pearson's quality assurance processes is given in *Annexe A*.

What resources are required?

Each qualification is designed to support learners working in the land-based engineering sector. Physical resources need to support the delivery of the qualifications and the assessment of the learning outcomes and must be of industry standard. Staff assessing the learner must meet the requirements within the overarching assessment strategy for the sector.

Unit format

Each unit in this specification contains the following sections.



Units

Unit 1: Monitor and Maintain Health and Safety in a Land-based Engineering Work Area

Unit reference number: R/601/5311

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge and skills to monitor and maintain health and safety within a land-based engineering work environment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to monitor and maintain health and safety within land-based engineering work area	1.1	Work safely, cleanly and tidily at all times, complying with health and safety and other relevant regulations and guidelines			
		1.2	Carry out main responsibilities of an employee in relation to health and safety in the workplace			
		1.3	Follow procedures to both prevent and deal with hazards and risks in the workplace			
2	Know how to monitor and maintain health and safety within the work area	2.1	Outline the responsibilities of an employer and employee in relation to health and safety in the workplace			
		2.2	Describe the procedures used to prevent and deal with risks and hazards in the workplace			
		2.3	Describe processes, products, activities, tools and equipment that require recognised training and competence to prevent personal injury and harm to others			
		2.4	Describe how to safely move, raise and support loads manually and with the aid of equipment			
		2.5	Identify the different types of fire extinguishers found in the workplace and state their application			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 2: Land-based Engineering Operations - Applying Mechanical Principles

Unit reference number: L/600/3433

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to provide the learner with the knowledge and skills required to apply mechanical engineering principles within land-based engineering operations.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to apply mechanical engineering principles	1.1	Remove and refit components to suit application and manufacturer's specification			
		1.2	Test and verify power transmission and securing devices			
		1.3	Check components and machines for static and dynamic balance and stability			
		1.4	Set linkages and select components to gain optimal mechanical advantage			
2	Know how to apply mechanical engineering principles	2.1	Describe the application, installation and maintenance of bearings			
		2.2	Describe the use of specialist tools to install and maintain components			
		2.3	Describe the construction, characteristics and fitting methods of seals			
		2.4	Describe how directional rotation, reciprocating movement, timing and balance are achieved			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 3: Land-based Engineering Operations - Understand how to Use, Service and Maintain Tools and Equipment

Unit reference number: R/600/3434

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to provide the learner with the knowledge, understanding and skills required to select, use and maintain tools and equipment used within land-based engineering operations.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to select, safely use, service and maintain tools and equipment	1.1	Identify, select and safely use tools and equipment			
2	Know how to select, use and maintain tools and equipment appropriate to the task	2.1	Compare tools and equipment available to undertake relevant tasks			
		2.2	Describe the operational techniques and maintenance of tools			
		2.3	Describe the range of tools for thread identification and maintenance			
		2.4	Identify the different power supply requirements for power tools			
		2.5	Describe how to isolate mains electrical equipment and how to charge portable tool packs			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 4: Land-based Engineering Operations - Material Preparation, Shaping and Assembling

Unit reference number: F/600/3431

Level: Level 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to provide the learner with the knowledge and skills required to perform materials preparation, shaping and fixing.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform material preparation, shaping and assembly operations	1.1	Interpret information in relation to engineering tasks from engineering drawings, sketches and instructions			
		1.2	Mark out profiles to given specifications			
		1.3	Produce profiles and process materials to given specifications and tolerances			
		1.4	Assemble and verify components and sub assemblies			
2	Know how to carry out material preparation, shaping and assembly operations	2.1	Describe how to interpret an engineering drawing			
		2.2	Describe the preparation techniques and tools used for marking out, cutting, shaping and finishing			
		2.3	Describe hardware fastener types, their characteristics and applications			
		2.4	Identify the different materials and methods used to seal components and assemblies			
		2.5	Outline the methods and techniques used to assemble components			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 5: Land-based Engineering Operations - Carry out Servicing and Maintenance on Land-based Equipment

Unit reference number: F/600/3428

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to provide the learner with the knowledge, understanding and skills required to carry out servicing and maintenance operations within land-based engineering.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform servicing and maintenance operations on land-based equipment	1.1	Prepare equipment and the working area prior to service and maintenance operations			
		1.2	Inspect equipment for conformity to manufacturer's specifications and take remedial actions			
		1.3	Carry out service operations in line with manufacturer's schedules and standards			
		1.4	Test, clean and reinstate the machine to operational condition			
		1.5	Record and process information			
2	Know how to perform service and maintenance operations in land-based equipment	2.1	Outline the reasons for service and maintenance operations			
		2.2	Describe routine service and scheduled maintenance actions to be taken			
		2.3	Describe and differentiate between the different types of filter, their construction, function and service requirements			
		2.4	Describe how to assess and prepare machinery prior to service and maintenance operations			
		2.5	Describe how to remove, dismantle, repair, reinstate and adjust service items			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.6	Describe the methods used to carry out compliance tests on machinery related to the service work that has been performed			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 6: Land-based Engineering Operations - Perform Thermal Joining and Cutting Processes

Unit reference number: A/600/3427

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge and skills required for carrying out thermal joining and cutting processes within land-based operations.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform thermal joining and cutting	1.1	Identify welding and thermal joining equipment			
		1.2	Identify ferrous and non-ferrous materials and their suitability			
		1.3	Prepare the workplace materials and equipment to carry out a thermal joining process			
		1.4	Use the correct techniques to carry out thermal joining tasks			
		1.5	Join ferrous or non-ferrous materials to the required quality and dimensions			
		1.6	Identify faults in welded, bronze welded and soldered joints			
		1.7	Inspect and maintain equipment and change consumables used in joining processes			
		1.8	Safely set up and shut down equipment for oxyacetylene gas heating, cutting and joining			
2	Know how to perform thermal joining and cutting techniques	2.1	Describe how to identify ferrous and non-ferrous materials and their respective joining characteristics			
		2.2	Describe the material preparation and joining procedures			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.3	Describe the techniques for joining ferrous and non-ferrous materials using gas or electric welding and soldering methods			
		2.4	Describe how to select, prepare and set the relevant equipment to carry out welding and joining tasks			
		2.5	Describe how to detect and correctly identify faults and their causes in welded joints			
		2.6	Describe the precautions required when engaging in a thermal joining and cutting process			
		2.7	Describe how to safely set up equipment and use the correct techniques for oxyacetylene gas heating, cutting and joining			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 7: Land-based Engineering Operations - Service and Repair Cooling and Lubrication Systems

Unit reference number: T/600/3426

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to give the learner the knowledge and skills required when working with cooling and lubrication systems within land-based engineering.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on cooling and lubrication systems	1.1	Identify different types of cooling and lubrication systems and their components			
		1.2	Identify the different types of coolants and lubricants and select the appropriate product to comply with manufacturer's specifications			
		1.3	Perform operations requiring the drainage and replacement of lubricants and coolants			
		1.4	Prepare and test cooling and lubrication systems and their components			
2	Know the construction and function of cooling and lubrication systems, their components	2.1	State the reasons and methods of the control of temperature in land-based engineering applications			
		2.2	Describe the causes and symptoms of insufficient cooling and lubrication			
		2.3	Describe the fundamental operating principles of lubrication and cooling systems in engines			
		2.4	State the reasons for lubrication and cooling systems in engines			
		2.5	Describe how to dismantle, repair and reinstate cooling and lubrication systems			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 8: Service and Repair Electrical Systems on Land-based Equipment

Unit reference number: Y/600/3404

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge, understanding and skills required to carry out service and repair on electrical systems within land-based equipment.

The learner will need to ensure they comply with current legislation and guidelines to complete this unit.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on electrical systems and their components used in land-based equipment	1.1	Identify electrical circuits and components and their functions from wiring diagrams and visual recognition			
		1.2	Perform tests using equipment and practices to measure and verify the correct operation of electrical systems and their components			
		1.3	Identify and rectify faults in electrical systems and components			
		1.4	Maintain the integrity of electrical systems			
		1.5	Remove dismantle, rectify faults, repair and reinstate electrical components and circuits to manufacturer's specifications and standards			
2	Know the construction, function and operation of electrical systems and circuits and their components	2.1	Identify and interpret electrical circuit diagrams			
		2.2	Summarise Ohm's law its application and principles			
		2.3	Compare the specification, safe maintenance and charging of different types of battery types			
		2.4	Describe the principles, construction and function of electrical circuits and their components			
		2.5	Describe how to remove dismantle, test, verify, repair and reinstate electrical circuits and their components			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.6	Outline the risks posed to electrical systems and components by other activities or incidents			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 9: Service and Repair Hydraulic Systems and Components on Land-based Equipment

Unit reference number: L/600/3402

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge, understanding and skills required to service and repair hydraulic systems and components in land-based equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and maintenance operations on hydraulic systems and their components	1.1	Identify and locate, hydraulic systems and their components			
		1.2	Build and test a basic hydraulic circuit			
		1.3	Prepare the hydraulic system to be tested and carry out tests using system diagnostic tools			
		1.4	Remove dismantle, repair and reinstate hydraulic systems and components to manufacturer's specifications and factory settings			
2	Know the construction, function and operation of hydraulic circuit systems and their components used in land-based engineering applications.	2.1	Describe how to read and interpret hydraulic circuit diagrams and symbols			
		2.2	Describe how to remove, dismantle, repair and reinstate hydraulic components and systems			
		2.3	Describe different types of hydraulic circuits and the construction and function of hydraulic system components			
		2.4	Describe the primary causes of hydraulic failure and their symptoms			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 10: Maintain and develop personal performance

Unit reference number: F/502/1689

Level: 2

Credit value: 2

Guided learning hours: 15

Unit aim

The aim of this unit is to provide the learner with the knowledge and skills to be able to agree and develop their own personal performance with an appropriate person.

The learner will maintain and develop personal performance with regard to:

- working to targets and completing specific tasks
- quality of work.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Maintain personal performance	1.1	Identify current competence and areas for development using relevant techniques and processes			
		1.2	Carry out work in accordance with responsibilities and organisational requirements			
2	Develop personal performance	2.1	Agree personal performance and targets with an appropriate person			
		2.2	Review performance and progress regularly and use the outcome to plan future development activities			
		2.3	Seek advice from an appropriate person if clarification is required concerning specific tasks			
		2.4	Seek constructive feedback and advice from others and use it to help maintain and improve performance			
3	Know how to develop personal performance	3.1	State own limits of responsibility in relation to specific tasks and activities			
		3.2	State who to obtain advice from in relation to specific tasks and activities			
		3.3	List the correct procedures for obtaining advice			
		3.4	State the risks involved in not obtaining advice where specific tasks and activities are unclear			

Learning outcomes	Assessment criteria		Evidence type	Portfolio reference	Date
	3.5	Describe how to determine and agree development needs and personal targets			
	3.6	State why personal performance should be reviewed			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 11: Establish and maintain effective working relationships with others

Unit reference number: T/502/1690

Level: 2

Credit value: 2

Guided learning hours: 15

Unit aim

The aim of this unit is to give the learner the knowledge and skills required to work effectively with others under minimal direction through clear communication and cooperation.

The learner will establish and maintain effective working relationships with the colleagues, supervisors and managers, persons external to the team, department or organisation.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Maintain working relationships with others	1.1	Identify opportunities to improve working practices with the appropriate person			
		1.2	Carry out activities requiring cooperation with others in accordance with required procedures			
		1.3	Communicate with others in a way which promotes effective working relationships			
		1.4	Keep others informed about work plans or activities which affect them			
		1.5	Seek assistance from others without causing undue disruption to normal work activities			
		1.6	Respond in a timely and positive way when others ask for help or information			
2	Understand why good working practices are important	2.1	State why good working relationships are important			
		2.2	Suggest ways in which good working relationships can be maintained			
		2.3	State the methods of dealing with disagreements within the workplace			
		2.4	Describe own level of responsibility in relation to dealing with disagreements			
		2.5	State why effective communication is important			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 12: Land-based Engineering Operations - Service and Repair Engines and Components

Unit reference number: K/600/3424

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge and skills required to perform engine service and repair tasks on land-based engineering equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform basic service and repair procedures on engines and their components	1.1	Identify engine types and their components			
		1.2	Remove dismantle, repair and reinstate ancillary engine components and sub-assemblies to manufacturers' specifications and standards			
2	Know the construction, function and operation of two stroke, four stroke spark and compression ignition engines and their components	2.1	Describe the types, construction and operating principles of land-based engines			
		2.2	Describe the function and types of engine components			
		2.3	Describe engine features and their purpose within the engine construction			
		2.4	Describe how to remove dismantle, repair and reinstate engines and components to manufacturers' specifications and standards (excluding fuel, induction and exhaust systems)			
		2.5	Describe engine starting and stopping procedures			
		2.6	State the major differences between direct and indirect fuel injection systems			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 13: Service and Repair Clutches, Fluid Flywheels and Torque Converters on Land-based Equipment

Unit reference number: H/600/3423

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to give the learner the knowledge and skills required to service and repair clutches, flywheels and torque converters within land-based equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on clutches and associated devices	1.1	Carry out stall tests and assess the slip point of torque limiting clutches			
		1.2	Remove, dismantle, repair, and reinstate clutches and associated devices to manufacturer's specifications and standards			
		1.3	Identify and report reasons for clutch, fluid flywheel or torque converter failure			
2	Know the construction, function and operation of clutches and associated devices	2.1	Describe the different types, construction, and functions of clutches, fluid flywheels and torque converters			
		2.2	Explain the methods used to sequence clutch engagement and provide smooth drive take up			
		2.3	Explain how to remove, dismantle, repair, recondition and reinstate clutches, fluid flywheels and torque converters			
		2.4	Describe how to assess clutch failure, wear and condition			
		2.5	Identify the common causes and symptoms of clutch, fluid flywheel and torque converter failure			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 14: Service and Repair Mechanical Transmissions on Land-based Equipment

Unit reference number: Y/600/3421

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge and skills required to service and repair mechanical transmission in land-based equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on mechanical transmissions	1.1	Remove dismantle, repair and reinstate three transmission assemblies and their components to manufacturers' specifications and standards			
		1.2	Identify and report faults in mechanical transmission assemblies and their components			
2	Know the types and characteristics of transmission and gearboxes	2.1	Describe the types, construction, characteristics and operating principles of transmissions and gearboxes			
		2.2	Describe the drive path through a mechanical transmission and their components with the aid of the manufacturer's schematic drawings			
		2.3	Summarise the relationship between power, speed and torque and the influence on transmission layout and component size			
3	Know how to remove and reinstate transmission	3.1	Describe how to remove, dismantle, repair and reinstate transmissions and their components			
4	Know how to identify transmission faults	4.1	Explain how to identify land-based equipment mechanical transmission faults			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 15: Service and Repair Braking Systems on Land-based Equipment

Unit reference number: R/600/3420

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to give the learner the knowledge and skills required in order to service and repair braking systems on land-based equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on braking systems and their components	1.1	Identify braking systems and their components			
		1.2	Perform tests, decontaminate, remove, dismantle, repair and reinstate braking systems to meet manufacturer's/technical and legislative compliance			
		1.3	Identify and report braking system faults			
2	Know the construction, function and operation of braking systems	2.1	Describe the construction and function of braking systems and their components			
		2.2	Describe how to remove, dismantle, repair and reinstate braking systems and their components			
		2.3	Describe the effects that heat can have on braking efficiency and brake components			
		2.4	Summarise the effects of incorrect braking relationships between towing vehicle and attachments			
3	Know how to recognise the faults in braking systems	3.1	Describe how to recognise faults in braking systems			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 16: Service and Repair Wheeled and Tracked Steering Systems on Land-based Equipment

Unit reference number: D/600/3419

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to give the learner the knowledge and skills required to work with wheeled and tracked steering systems on land-based equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service operations on wheeled or tracked steering systems	1.1	Remove, dismantle, reassemble, and reinstate steering systems to meet manufacturer's /technical/legislative compliance			
		1.2	Use appropriate tools and equipment, check and set steering geometry			
		1.3	Identify and rectify the cause of steering faults			
2	Know the construction, function and operation of wheeled and tracked steering systems	2.1	Describe the working principles of mechanical, power assisted and hydrostatic steering systems and their application			
		2.2	Describe the types, construction and function of steering system components			
		2.3	Describe the principles and geometry of steering systems			
		2.4	Describe how to remove, dismantle, reassemble and replace steering system components			
		2.5	State the methods of checking and adjusting steering geometry			
		2.6	Identify the basic mechanical operating principles of auto steer and guidance systems used in land-based equipment			
3	Know the symptoms and causes of steering faults	3.1	Describe the symptoms characteristics and causes of common steering system faults			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 17: Service and Repair Tyres and Tracks on Land-based Equipment

Unit reference number: K/600/3410

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to give the learner the knowledge and skills required to perform service and repair operations on tyres, wheel assemblies and/or track and their components on land-based equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on tyres, wheel assemblies or tracks and their components	1.1	Remove, dismantle, repair and reinstate tyres and wheel assemblies or tracks, their running gear and components to manufacturer's specifications			
		1.2	Attach, adjust and remove stability and attractive aids			
		1.3	Identify and rectify faults relating to tyres, wheel assemblies or tracks and their components			
2	Know the types, construction and operating principles of tyres, wheel assemblies and tracks and their components	2.1	Outline the types, construction and operating principles of tyres, wheel assemblies and tracks, their running gear and components			
		2.2	Describe the types, construction and applications of wheels, tyres tracks and tractive aids			
		2.3	Outline the implications of weight distribution and transfer on tractive performance and stability			
		2.4	Outline the implications of track widths, weight distribution and transfer, ballast and tractive aids on legislative and legal responsibilities			
3	Know how to carry out service and maintenance operations on tyres and tracks	3.1	Describe the methods of removing dismantling, repairing and reinstatement of tyres wheel assemblies and tracks, their running gear and components			
		3.2	Describe how to carry out land-based equipment tests and checks			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		3.3	Describe how to identify and rectify faults relating to tyres, wheel assemblies and tracks and their components			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 18: Service and Repair Land-based Cutting and Mowing Equipment

Unit reference number: T/600/3409

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to give the learner the knowledge and skills required for servicing land-based cutting and mowing equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to service cutting and mowing equipment	1.1	Identify cutting and mowing equipment used in the land-based sector			
		1.2	Dismantle, repair and reinstate cutting or mowing machinery and tools to manufacturers' specifications			
		1.3	Sharpen and adjust cutting mechanisms to conform with manufacturers' specification			
		1.4	Identify faults affecting cutting performance and rectify to perform within the manufacturer's specification			
2	Know the construction, function and operation of cutting and mowing equipment	2.1	Describe the working principles of cutting and mowing equipment and their components			
		2.2	Describe how to dismantle, repair and reinstate cutting and mowing equipment			
		2.3	Describe the methods of sharpening and setting cutting mechanisms and components			
3	Know how the performance of cutting and mowing equipment is effected by conditions	3.1	Describe the effect of crop/product type and conditions on the cutting and mowing process			
		3.2	State how adjustments and settings effect the performance of cutting and mowing equipment			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 19: Service and Repair Land-based Harvesting and Processing Equipment

Unit reference number: M/600/3408

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge, understanding and skills required to service and repair harvesting and processing equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on harvesting and processing equipment	1.1	Dismantle, repair and reinstate harvesting and/or processing equipment to the manufacturer's specifications and standards			
		1.2	Identify and rectify performance faults in equipment to achieve optimal performance			
		1.3	Identify and rectify faults in equipment which cause crop or product loss			
		1.4	Prepare equipment for periods of storage or lay up when not in use			
2	Know how to service and repair harvesting and processing equipment	2.1	Describe the construction, types and function of harvesting and processing equipment			
		2.2	Describe how to remove, dismantle, repair and reinstate and set up harvesting and processing equipment to manufacturer's specifications			
		2.3	Describe the processes used in harvesting and processing equipment			
		2.4	Describe the methods of material handling within the harvesting process			
		2.5	Describe the appropriate methods of clearing blockages from harvesting and processing equipment			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.6	Identify the causes of crop or product loss and poor sample quality contamination, damage, wastage and non-compliance			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 20: Service and Repair Land-based Soil Preparation and Plant Establishment Equipment

Unit reference number: K/600/3407

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge and skills required to service and repair soil preparation and plant establishment equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to service and set up soil preparation equipment	1.1	Remove, dismantle, repair and reinstate soil preparation and plant establishment machinery to manufacturers' specification			
		1.2	Set up trailed and mounted machines to work effectively with the prime mover			
2	Know the construction, function and operation of soil preparation, cultivation and plant establishment equipment	2.1	Describe the types, construction and function of soil engaging, preparation and cultivation machinery and plant establishment equipment			
		2.2	Describe how to remove, dismantle, repair and reinstate soil preparation, cultivation and plant establishment machinery and equipment			
		2.3	Describe how to set up and verify the performance of soil preparation, cultivation and plant establishment equipment			
		2.4	Describe the methods and mechanisms used to meter and calibrate application rates			
3	Know the factors which affect equipment and performance	3.1	Outline the impact of soil, seed, fertiliser types, crops, weather conditions on equipment performance settings			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 21: Service and Repair Land-based Transport Handling and Storage Equipment

Unit reference number: H/600/3406

Level: 2

Credit value: 10

Guided learning hours: 60

Unit aim

The aim of this unit is to give the learner the knowledge and skills required when working with transport, handling and storage equipment within land-based operations.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to service and repair transport, handling and storage equipment	1.1	Clean and prepare transport, handling and storage equipment for service and maintenance			
		1.2	Remove, dismantle, repair and reinstate, transport, handling and storage equipment to manufacturers' specifications			
		1.3	Safely clear blockages from equipment			
2	Know the construction, function and operation of transport, handling and storage equipment	2.1	Identify transport, handling and storage equipment and their components			
		2.2	Explain how to remove, dismantle, repair and reinstate transport, handling and storage equipment and their components			
		2.3	Describe how to identify and isolate services from handling and storage equipment			
		2.4	Describe the layout and characteristics of transport, handling and storage equipment			
		2.5	Describe how to clean and prepare transport, handling and storage equipment for service and repair operations			
		2.6	Describe the methods of shortening, lengthening and joining belts, elevators and conveyors			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.7	Define the appropriate methods of clearing blockages from transport, handling and storage equipment			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 22: Service and Repair Pneumatic Systems and Components for Land-based Equipment

Unit reference number: J/600/3401

Level: 2

Credit value: 5

Guided learning hours: 30

Unit aim

The aim of this unit is to give the learner the knowledge, understanding and skills required to repair and service pneumatic systems and components for land-based equipment.

Assessment methodology

This unit is assessed in the workplace or in conditions resembling the workplace. Learners can enter the types of evidence they are presenting for assessment and the submission date against each assessment criterion. Alternatively, centre documentation should be used to record this information.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to perform service and repair operations on pneumatic systems and their components	1.1	Assemble or repair pipes and hoses used within pneumatic systems			
		1.2	Build and test a basic air pressure circuit (to include compressor, control valve, relief valve, pneumatic consumer)			
		1.3	Remove, dismantle, repair and reinstate pneumatic systems and components to manufacturers' specifications			
2	Know the construction, function and operation of pneumatic systems and components used in land-based engineering	2.1	Identify pneumatic systems and components			
		2.2	Describe the different types of pneumatic circuit including single line and twin line			
		2.3	Describe how to remove, dismantle, repair and reinstate pneumatic components and systems			
		2.4	Describe the construction, types and function of pneumatic system components			
		2.5	Describe the primary causes of pneumatic failures and their symptoms			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Further information

To get in touch with us visit our 'Contact us' pages:

- Edexcel, BTEC and Pearson Work Based Learning contact details: qualifications.pearson.com/en/support/contact-us.html
- books, software and online resources for UK schools and colleges: www.pearsonschoolsandfecolleges.co.uk

Key publications

- *Adjustments for candidates with disabilities and learning difficulties, Access and Arrangements and Reasonable Adjustments, General and Vocational qualifications* (Joint Council for Qualifications (JCQ))
- *Supplementary guidance for reasonable adjustments and special consideration in vocational internally assessed units* (Pearson)
- *General and Vocational qualifications, Suspected Malpractice in Examination and Assessments: Policies and Procedures* (JCQ)
- *Equality Policy* (Pearson)
- *Recognition of Prior Learning Policy and Process* (Pearson)
- *UK Information Manual* (Pearson)
- *Pearson Edexcel NVQs, SVQs and competence-based qualifications – Delivery Requirements and Quality Assurance Guidance* (Pearson)

All of these publications are available on our website: qualifications.pearson.com

Further information and publications on the delivery and quality assurance of NVQ/Competence-based qualifications are available at our website on the Delivering BTEC pages. Our publications catalogue lists all the material available to support our qualifications. To access the catalogue and order publications, please go to the resources page of our website.

Useful publications

Related information and publications include:

- *Centre Handbook for Pearson NVQs and Competence-based Qualifications* published annually
- Functional Skills publications – specifications, tutor support materials and question papers
- the current Pearson publications catalogue and update catalogue.

Pearson publications concerning the Quality Assurance System and the internal and standards verification of vocationally related programmes can be found on the Pearson website.

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

To obtain the National Occupational Standards please go to www.ukstandards.org.uk.

Professional development and training

Pearson supports UK and international customers with training related to NVQ and 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 effective and efficient quality assurance systems.

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

The training we provide:

- is active
- is designed to be supportive and thought-provoking
- builds on best practice
- may be suitable for those seeking evidence for their continuing professional development.

Annexe A: Quality assurance

Key principles of quality assurance

- A centre delivering Pearson qualifications must be an Pearson recognised centre and must have approval for qualifications that it is offering.
- The centre agrees, as part of gaining recognition, to abide by specific terms and conditions relating to the effective delivery and quality assurance of assessment. The centre must abide by these conditions throughout the period of delivery.
- Pearson makes available to approved centres a range of materials and opportunities to exemplify the processes required for effective assessment and provide examples of effective standards. Approved centres must use the guidance on assessment to ensure that staff who are delivering Edexcel qualifications are applying consistent standards.
- An approved centre must follow agreed protocols for: standardisation of assessors; planning, monitoring and recording of assessment processes; internal verification and recording of internal verification processes and dealing with special circumstances, appeals and malpractice.

Quality assurance processes

The approach to quality assured assessment is made through a partnership between a recognised centre and Pearson. Pearson is committed to ensuring that it follows best practice and employs appropriate technology to support quality assurance processes where practicable. The specific arrangements for working with centres will vary. Pearson seeks to ensure that the quality assurance processes it uses do not inflict undue bureaucratic processes on centres, and works to support them in providing robust quality assurance processes.

The learning outcomes and assessment criteria in each unit within this specification set out the standard to be achieved by each learner in order to gain each qualification. Pearson operates a quality assurance process, designed to ensure that these standards are maintained by all assessors and verifiers.

For the purposes of quality assurance, all individual qualifications and units are considered as a whole. Centres offering these qualifications must be committed to ensuring the quality of the units and qualifications they offer, through effective standardisation of assessors and internal verification of assessor decisions. Centre quality assurance and assessment processes are monitored by Pearson.

The Pearson quality assurance processes will involve:

- gaining centre recognition and qualification approval if a centre is not currently approved to offer Pearson qualifications
- annual visits to centres by Pearson for quality review and development of overarching processes and quality standards. Quality review and development visits will be conducted by an Pearson quality development reviewer
- annual visits by occupationally competent and qualified Pearson Standards Verifiers for sampling of internal verification and assessor decisions for the occupational sector
- the provision of support, advice and guidance towards the achievement of National Occupational Standards.

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

Annexe B: Centre certification and registration

Pearson Standards Verifiers will provide support, advice and guidance to centres to achieve Direct Claims Status (DCS). Pearson will maintain the integrity of Pearson NVQs through ensuring that the awarding of these qualifications is secure. Where there are quality issues identified in the delivery of programmes, Pearson will exercise the right to:

- direct centres to take action
- limit or suspend certification
- suspend registration.

The approach of Pearson in such circumstances is to work with the centre to overcome the problems identified. If additional training is required, Pearson will aim to secure the appropriate expertise to provide this.

What are the access arrangements and special considerations for the qualifications in this specification?

Centres are required to recruit learners to Pearson qualifications with integrity.

Appropriate steps should be taken to assess each applicant's potential and a professional judgement should be made 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 Pearson's policy on learners with particular requirements.

Pearson's policy on access arrangements and special considerations for Edexcel qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the 2010 Equality Act) without compromising the assessment of skills, knowledge, understanding or competence. Please refer to *Access Arrangements and Special Considerations for BTEC and Pearson NVQ Qualifications* for further details (qualifications.pearson.com).

Annexe C: Additional requirement for qualifications that use the term 'NVQ' in a qualification title

For information please go to www.ofqual.gov.uk to access the document *Operating rules for using the term 'NVQ' in a qualification title*.

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For information about Edexcel, BTEC or LCCI qualifications visit qualifications.pearson.com

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