

**Skills and Education Group Awards
ABC Level 2 Award in Knowledge of the
Service and Repair of Electrically Propelled
Buses and Coaches**

Qualification Guidance

603/6893/7

About Us

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

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

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

Sources of Additional Information

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

Copyright

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

This document may be copied by approved centres for the purpose of assessing learners. It may also be copied by learners for their own use.

Specification Code, Date and Issue Number

The specification code is A6012-02.

For Skills and Education Awards Use Only			
Issue	Date	Details of change	Section/page
1	18/11/2020	Original document	n/a

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

Contents

About Us.....	2
Contents.....	3
Introduction	4
Pre-requisites	4
Qualification Structure.....	4
Assessment.....	5
Teaching Strategies and Learning Activities.....	6
Progression Opportunities	6
Tutor Requirements	6
Language.....	6
Qualification Summary	7
Unit Details	8
1. Knowledge of the Service and Repair of Electrically Propelled Buses and Coaches..	8

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

Introduction

This single unit qualification is designed for people who work on or near electric or electric/hybrid buses and coaches. Examples of these job roles include: vehicle fitters, mechanics and technicians, vehicle electricians, recovery specialists, vehicle inspectors, body repair specialists and refinishers. The unit includes essential knowledge of the hazards associated with electric and hybrid vehicles, the precautions to follow to avoid these hazards and an understanding of the operating principles of these vehicles. It enables the learner to understand how to safely isolate and reinstate the high voltage system and to remove and replace high voltage components.

Pre-requisites

There are no specific academic or vocational achievement requirements to register on this qualification. However, a basic knowledge of the operation of an Electric/Hybrid vehicle and its relevant systems would be an advantage.

Qualification Structure

This qualification is also mapped to the following National Occupational Standard –IMIEV01, IMIEV03 and IMIEV04:

Unit	Unit Number	Level	Credit Value	GLH
Mandatory – Group A				
Knowledge of the Service and Repair of Electrically Propelled Buses and Coaches	L/618/5652	2	2	16

Assessment

In order to successfully achieve this qualification a learner must fully meet all of the learning outcomes. This is done by completing the Skills and Education Group Awards' online multiple choice test.

The multiple choice online test is separated into four areas and contains a total of 20 questions. The maximum time allowed to complete the assessment is **60 minutes** and the questions will assess the knowledge from across the breadth of the criteria in the following way:

Subject	Number of questions
1. Understand the risks and hazards associated with electric and electric/hybrid buses and coaches	5
2. Know and understand the different types of electric and electric/hybrid buses and coaches, associated technology, components and operating principles	5
3. Know how to prepare electric and electric/hybrid buses and coaches when carrying out service and repair procedures	5
4. Know how to work safely on electric and electric/hybrid buses and coaches	5

The grade boundaries for the online multiple choice knowledge test are as follows:

- 0 – 59% = **Fail**
- 60 – 79% = **Pass**
- 80 – 100% = **Distinction**

Online Test and Retakes

The online test must be conducted under exam conditions and in line with the SEG Awards document "Instructions for the Conduct of Examinations and Other External Assessment" which is available here:

<https://skillsandeducationgroupawards.co.uk/for-centres/>

There is no limit on the amount of retakes, however there will be a charge for each one taken.

Teaching Strategies and Learning Activities

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

Progression Opportunities

Learners who successfully complete the Level 2 Award may be able to continue in further education and training related to this area of expertise or progress into employment.

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

Tutor Requirements

Skills and Education Group Awards require those involved in the delivery process to be suitably experienced and/or qualified. In general terms, this usually means that the tutor must be knowledgeable of the subject/occupational area to at least the level they are delivering at.

Those responsible for Internal Quality Assurance (IQA) must be knowledgeable of the subject/occupational area to a suitable level to carry out accurate quality assurance practices and processes.

Language

This specification and associated assessment materials are in English only.

Qualification Summary

Qualification	
Level 2 Award in Knowledge of the Service and Repair of Electrically Propelled Buses and Coaches 603/6893/7	
Qualification Purpose	Prepare for further learning or training and/or develop knowledge and/or skills in a subject area
Regulation	The above qualification is regulated by: <ul style="list-style-type: none"> • Ofqual
Assessment	<ul style="list-style-type: none"> • External assessment • Internal and external moderation
Grading	Pass/distinction
Operational Start Date	01/09/2020
Review Date	31/08/2023
Operational End Date	
Certification End Date	
Guided Learning	16
Total Qualification Time (TQT)	17
ABC Sector	Automotive
Ofqual SSA Sector	4.3 Transportation Operation and Maintenance
Support from Trade Associations	
Administering Office	See the Skills and Education Group Awards website https://skillsandeducationgroupawards.co.uk/

Unit Details

1. Knowledge of the Service and Repair of Electrically Propelled Buses and Coaches

Unit Reference	L/618/5652
Level	2
Guided Learning	16
Unit Summary	This unit is for people who work on or near electric and electric/hybrid buses and coaches. Examples of these job roles include: vehicle fitters, mechanics and technicians, vehicle electricians, recovery specialists, vehicle inspectors, body repair specialists and refinishers. The unit includes essential knowledge of the hazards associated with electric and electric/hybrid buses and coaches and the precautions to follow to avoid these. It enables the learner to understand how to safely isolate and reinstate the high voltage system and to remove and replace high voltage components.
Learning Outcomes (1 to 3) <i>The learner will</i>	Assessment Criteria (1.1 to 4.1) <i>The learner can</i>
1. Understand the risks and hazards associated with electric and electric/hybrid buses and coaches	<p>1.1 Describe the health and safety legislation and workplace procedures relating to working on, near or with electric and electric/hybrid buses and coaches. To include:</p> <ul style="list-style-type: none"> • Electrical equipment (safety) regulations • The electricity at work regulations • Requirements for electrical installations BS 7671:2001 <p>1.2 Describe the dangers relating to:</p> <ul style="list-style-type: none"> • Working with high voltages • Electrocutation • Battery electrolyte gel • Hazards associated with alternative fuel sources and systems, including hydrogen fuel cells <p>1.3 Describe safety requirements including:</p> <ul style="list-style-type: none"> • First Aid

Skills and Education Group Awards

	<ul style="list-style-type: none">• Tools and equipment• Ventilation• High voltage isolation• Dealing with electrolyte gel spillages• Environmental Protection Action to include sections 33 and 34• Control of Substances Hazardous to Health (COSHH)• Independent working bay• Risk assessment• Workplace signage <p>1.4 Describe vehicle power systems and their associated safety risks, to include:</p> <ul style="list-style-type: none">• Internal combustion engines• Electric only vehicles• Plug-in hybrid vehicles• Hybrid vehicle systems
--	--

Skills and Education Group Awards

<p>2. Know and understand the different types of electric and electric/hybrid buses and coaches, associated technology, components and operating principles</p>	<p>2.1 Identify components that make up the electric and electric/hybrid systems, to include:</p> <ul style="list-style-type: none">• High voltage batteries• Service plug• Invertor• Transaxle damper• Motor generators• High energy cables• Convertor• Cooling components <p>2.2 Describe basic operating principles, to include:</p> <ul style="list-style-type: none">• Voltages- High and low• Batteries – High and auxiliary• Controls and keys• Vehicle de-energising periods required for safe repair• Chassis and insulated earth return systems• High voltage circuit protection• Regenerative braking• Temperature – Operating temperature of electric and electric/hybrid bus and coach batteries <p>2.3 Describe the construction and function of battery types, to include:</p> <ul style="list-style-type: none">• Nickel Metal Hydride (Ni-Mh)• Lithium (Li-ion) <p>2.4 Describe the construction and function of component parts, to include:</p> <ul style="list-style-type: none">• High voltage batteries• Service plug• Charging coupler• Inverter• Power/battery management system• Electric motors• Transaxle damper• Motor generators• High voltage cables• Converter• Cooling components <p>2.5 Describe how to store parts and components, to include:</p>
---	---

Skills and Education Group Awards

	<ul style="list-style-type: none"> • Batteries • Secure storage • Clear labelling • Procedure relating to damaged/broken parts • Correct disposal or recycling
<p>3. Know how to prepare electric and electric/hybrid buses and coaches when carrying out routine service and repair procedures</p>	<p>3.1 Describe the preparation of the vehicle, prior to conducting service/repair of the vehicle, to include:</p> <ul style="list-style-type: none"> • Select, check and use appropriate personal and vehicle protective equipment • Find, interpret and use sources of information applicable to component removal and replacement within an electric and electric/hybrid vehicle's high energy systems • Carry out a risk assessment on damaged and broken down electric and electric/hybrid buses and coaches • Making others aware of work being carried out on electric and electric/hybrid buses and coaches • Work in a way that minimises the risk of damage to your working environment and injury to yourself and others • Identifying high energy systems • Prepare, check and calibrate test equipment prior to use • Work in a way that minimises the risk of damage to other vehicle systems, components and units • Select replacement components which meet manufacturer's recommendations or conform to operational specification • Procedure to power down, isolate and make safe the high energy electrical system • Vehicle de-energising periods required for safe repair
<p>4. Know how to work safely on electric and electric/hybrid buses and coaches</p>	<p>4.1 Describe safe working methods for:</p> <ul style="list-style-type: none"> • Selecting and using appropriate PPE and equipment. • The implications of electrical conductivity through the human body • Selecting suitable sources of technical information • Carrying out safe isolation of the vehicle high energy system

Skills and Education Group Awards

	<ul style="list-style-type: none">• Confirm an electric and electric/hybrid bus and coach is safe to work on• Reduce the risk of high voltage hazard when working on and around electric and electric/hybrid buses and coaches• Hazards associated with electric and electric/hybrid buses and coaches• Implications of damaged electrical components and batteries• Correctly and safely re-instating the vehicle according to the manufacturer's instructions• Safely and correctly removing and replacing high energy components following manufacturer's instructions, industry recognised repair methods and health and safety requirements• Follow manufacturer's instruction to evaluate the performance of the reassembled high voltage system• Recovery of disabled electric and electric/hybrid buses and coaches• Store, dispose of, recycle and return removed high voltage components in line with legislative and organisation requirements• Ensure records are accurate, complete and passed to the relevant person(s) promptly in the format required
--	--

Skills and Education Group Awards

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

- Recognition of Prior Learning (RPL) – a method of assessment that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and do not need to develop through a course of learning.
- Exemption - Exemption applies to any certificated achievement which is deemed to be of equivalent value to a unit within Skills and Education Group Awards qualification but which does not necessarily share the exact learning outcomes and assessment criteria. It is the assessor's responsibility, in conjunction with the Internal Moderator, to map this previous achievement against the assessment requirements of the Skills and Education Group Awards qualification to be achieved in order to determine its equivalence.
- Any queries about the relevance of any certificated evidence, should be referred in the first instance to your centre's internal moderator and then to Skills and Education Group Awards.

It is important to note that there may be restrictions upon a learner's ability to claim exemption or credit transfer which will be dependent upon the currency of the unit/qualification and a learner's existing levels of skill or knowledge.

Where past certification only provides evidence that could be considered for exemption of part of a unit, learners must be able to offer additional evidence of previous or recent learning to supplement their evidence of achievement.

- Credit Transfer – Skills and Education Group Awards may attach credit to a qualification, a unit or a component. Credit transfer is the process of using certificated credits achieved in one qualification and transferring that achievement as a valid contribution to the award of another qualification. Units/Components transferred must share the same learning outcomes and assessment criteria along with the same unit number. Assessors must ensure that they review and verify the evidence through sight of:
 - Original certificates OR
 - Copies of certificates that have been signed and dated by the internal moderator confirming the photocopy is a real copy and make these available for scrutiny by the External Moderator.
- Equivalencies – opportunities to count credits from the unit(s) from other qualifications or from unit(s) submitted by other recognised organisations towards the place of mandatory or optional unit(s) specified in the rule of combination. The unit must have the same credit value or greater than the unit(s) in question and be at the same level or higher.

Skills and Education Group Awards

Skills and Education Group Awards encourages its centres to recognise the previous achievements of learners through Recognition of Prior Learning (RPL), Exemption, Credit Transfer and Equivalencies. Prior achievements may have resulted from past or present employment, previous study or voluntary activities. Centres should provide advice and guidance to the learner on what is appropriate evidence and present that evidence to the external moderator in the usual way.

Further guidance can be found in 'Delivering and Assessing ABC Awards Qualifications' which can be downloaded from <http://www.abcawards.co.uk/centres-grid-page-move/policies-procedures/>

Certification

Learners will be certificated for all units and qualifications that are achieved and claimed.

Skills and Education Group Awards' policies and procedures are available on the web site: <https://skillsandeducationgroupawards.co.uk/policies-and-procedures/>

Exemptions

There are no identified exemptions for this qualifications.

Glossary of Terms

GL (Guided Learning)

Guided learning hours are where the learner participates in education or training under the immediate guidance or supervision of a tutor (or other appropriate provider of education or training). It may be helpful to think – ‘Would I need to plan for a member of staff to be present to give guidance or supervision?’

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

Examples of Guided Learning include:

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

TQT (Total Qualification Time)

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

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

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

Examples of unsupervised activities that could contribute to TQT include:

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