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**22624VIC**

# **Course in Introduction to Working with Battery Electric Buses**

Version 1.1 September 2023

This course has been accredited under Part 4.4 of the Education and Training Reform Act 2006.

**Accredited for the period: 1 July 2023 to 30 June 2028**

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Version History:		Date
Version 1.1	Department of Education and Training (DET) details and contact information updated with Department of Jobs, Skills Industries and Regions (DJSIR) details in Section A	September 2023

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## Section A – Copyright and course classification information

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<p><b>3. Type of submission</b></p>	<p>This submission is for accreditation.</p>
<p><b>4. Copyright acknowledgement</b></p>	<p>Copyright of this material is reserved to the Crown in the right of the State of Victoria. © State of Victoria 2023.</p> <p>This work is licensed under a Creative Commons Attribution-No Derivatives 4.0 International licence (see <a href="#">Creative Commons</a> for more information.).</p> 

## Section A – Copyright and course classification information

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<p><b>6. Course accrediting body</b></p>	<p>Victorian Registration and Qualifications Authority</p>
<p><b>7. AVETMISS information</b></p>	<p>ANZSCO Code: 321211 Motor Mechanics (General).          ASCED Codes: 0305 Automotive Engineering and Technology.</p>
<p><b>8. Period of accreditation</b></p>	<p>1 July 2023 to 30 June 2028</p>

## Section B – Course information

<b>1. Nomenclature</b>	<b>Standard 4.1 and 5.8 AQTF 2021 Standards for Accredited Courses</b>
<b>1.1 Name of the qualification</b>	Course in Introduction to Working with Battery Electric Buses
<b>1.2 Nominal duration of the course</b>	20 hours
<b>2. Vocational or educational outcomes</b>	<b>Standard 5.1 AQTF 2021 Standards for Accredited Courses</b>
<b>2.1 Outcome(s) of the course</b>	<p>This course describes the skills and knowledge required to perform non-technical tasks to prepare battery electric buses (BEB) for operation. It includes identifying hazards and risks, controlling risks, performing pre-operational visual inspections of BEB and controlling the risks associated with broken-down, damaged or compromised BEB.</p> <p><b>The unit applies to bus depot staff and bus technicians undertaking non-technical work with BEB.</b></p>
<b>2.2 Course description</b>	<p>This course provides bus technicians and bus depot staff with the skills and knowledge required to safely undertake non-technical tasks to prepare BEB for operation.</p> <p>It includes identifying hazards and risks, controlling risks, performing pre-operational visual inspections of BEB and controlling the risks associated with broken-down, damaged or compromised BEB.</p> <p>This course is not intended to provide individuals with the technical skills needed to drive, service, maintain and repair BEB.</p>
<b>3. Development of the course</b>	<b>Standards 4.1, 5.1, 5.2, 5.3 and 5.4 AQTF 2021 Standards for Accredited Courses</b>
<b>3.1 Industry, education, legislative, enterprise or community needs</b>	<p>Victoria's existing bus fleet runs on diesel which is a fossil fuel made from crude oil. Fossil fuels are a non-renewable resource and burning fossil fuels is a major contributor to greenhouse gases and pollution.</p> <p>In 2016, Australia signed the Paris Agreement on climate change pledging to reduce greenhouse gas emissions and limit global warming to below 2°C.<sup>1</sup> In 2017, the Victorian Government committed to climate change action when it passed the Climate Change Act.<sup>2</sup> The Act includes</p>

<sup>1</sup> Department of Climate Change, Energy, the Environment and Water, 'International climate change commitments', accessed 16/10/22 at [www.dceew.gov.au/climate-change/international-commitments#:~:text=Australia%20is%20party%20to%20the,Convention%20on%20Climate%20Change%20\(UNFCCC\).](http://www.dceew.gov.au/climate-change/international-commitments#:~:text=Australia%20is%20party%20to%20the,Convention%20on%20Climate%20Change%20(UNFCCC).)

<sup>2</sup> Department of Environment, Land, Water and Planning, 'Climate Change Act 2017', accessed 16/10/22 at [www.climatechange.vic.gov.au/legislation/climate-change-act-2017](http://www.climatechange.vic.gov.au/legislation/climate-change-act-2017).



a long-term net zero greenhouse gas emissions target by 2050. To meet this target, Victoria is working towards reducing the amount of greenhouse gas emissions while capturing and storing the rest.

As part of the response to climate change, Victoria is moving to renewable energy sources and the Victorian bus fleet is to be replaced with zero-emissions vehicles, including BEBs. BEBs run on electricity, which is renewable energy when sourced from naturally renewable energy sources such as the sun and wind.

As Victoria progressively replaces existing vehicles in bus fleets with Battery Electric Buses (BEB), the job roles include:

- diesel mechanics
- automotive electricians
- support staff
- yard hands
- crash repairers/fabricators/first responders
- refuellers
- schedulers.

BEBs are no less safe than diesel buses, but they do have different safety risks that must be controlled to create a safe working environment for Victorian bus industry workers. These risks include electrical safety risks from stored and generated electrical energy, chemical risks from battery electrolytes and risks related to the powerful magnets contained in BEB components.<sup>3</sup>

The current Victorian bus industry workforce is not equipped with the skills and knowledge they need to control the risks and work safely with BEBs, and there are no nationally recognised training products available to address the need.

The AMWU and the Victorian bus industry, including individual employers and the peak industry body, are working together with the support of the Victorian Government to prepare for the transition to BEBs.<sup>4</sup> Included in this commitment is the development of a training product to provide Victorian bus workers with the skills and knowledge they need to work safely with BEBs.

In Victoria there is a clear need, identified by both the Victorian Government and the bus industry, to prepare existing and new industry staff to work with BEB.

Evidence to support the need for the course includes:

<sup>3</sup> Safe Work NSW, 'Electric Vehicles', accessed 16/10/22 at [www.safework.nsw.gov.au/hazards-a-z/electric-vehicles](http://www.safework.nsw.gov.au/hazards-a-z/electric-vehicles).

<sup>4</sup> AMWU Victoria Branch website, 'Introducing Michális, our new EV Project Officer', accessed 16/10/22 at [www.amwu.org.au/our\\_new\\_ev\\_project\\_officer](http://www.amwu.org.au/our_new_ev_project_officer).

- International climate change and emission reduction research highlighting the need for rapid introduction of zero-emission vehicles.<sup>5</sup>
- Victorian State Government policies and programs to accelerate the introduction of BEB, including *Victoria's Bus Plan*<sup>6</sup> and *Zero Emissions Trials*,<sup>7</sup> and Victorian legislation to end the purchase of diesel buses from 2025.<sup>8</sup>
- Community support for zero emissions buses demonstrated by *The Australia Institute* in February 2022 which found that 71% of Victorians supported the Victorian State Government's target of a 100% zero emissions bus fleet by 2030.<sup>9</sup>
- Victorian bus industry support for and participation in the development of a course to address an identified need for BEB training.
- Funding from the Victorian Government through the *Department of Education and Training's* Workplace Training Innovation Fund for the development of this course.
- Surging demand from industry for accredited training for technicians to enable them to work on battery electric vehicles.

#### **Meeting Victorian Government and bus industry objectives**

The Victorian Government's objectives relating to the achievement of zero emissions are inherent in *Victoria's Bus Plan* and *Zero Emissions Trials* and evidenced by the funding of the development of this accredited course to enable the successful transition of workers to BEB.

The project was announced by the Minister for Public Transport, The Hon. Ben Carroll in April 2022 to:

- support achievement of the Government's zero emission objectives;<sup>10</sup> and,
- respond to demands from the bus industry for focused accredited training to support workers through the imminent

<sup>5</sup> Department of Foreign Affairs & Trade, 'International cooperation on climate change', accessed 17/10/22 at [www.dfat.gov.au/international-relations/themes/climate-change/international-cooperation-on-climate-change](http://www.dfat.gov.au/international-relations/themes/climate-change/international-cooperation-on-climate-change); and, The Australian Institute, 'Next Stop: Zero emissions buses by 2030', by Audrey Quicke and Sienna Parrott, May 2022, accessed 14/10/22 at <https://australiainstitute.org.au/wp-content/uploads/2022/05/P1229-Next-stop-for-electric-buses-WEB.pdf>.

<sup>6</sup> *Op.cit.*

<sup>7</sup> 'Melbourne's Zero Emissions Bus Trial advances with launch of first electric buses', *Intelligent Transport*, 11 October 2022, at [www.intelligenttransport.com/transport-news/140278/melbournes-zero-emissions-bus-trial-electric-buses/](http://www.intelligenttransport.com/transport-news/140278/melbournes-zero-emissions-bus-trial-electric-buses/) (accessed 13/10/2022).

<sup>8</sup> Victoria State Government, Department of Transport, 'Victoria's Bus Network Reform', at <https://engage.vic.gov.au/busreform>.

<sup>9</sup> The Australian Institute, 'Polling-Electric Buses in Victoria', May 2022, at <https://australiainstitute.org.au/wp-content/uploads/2022/05/Polling-Vic-EVs-WEB.pdf>.

<sup>10</sup> Victoria State Government, Department of Education and Training, 'Workforce Training Innovation Fund- A targeted, Skills First funding stream', accessed 23 October 2022 at <https://www.vic.gov.au/workforce-training-innovation-fund>.





transition to BEB.

It is funded by the Victorian Government's *Workforce Training Innovation Fund* to develop and trial:

*a pilot course that will gear up bus industry workers to work on zero emission electric vehicles, as Victoria works to halve its emissions by 2030.*

The project is managed by the Victoria Branch of the Australian Manufacturing Workers Union in a collaboration with four major Victorian bus companies, the Bus Association of Victoria (BusVic) and Bendigo Kangan Institute as active partners.<sup>11</sup>

### **Victoria's Bus Plan and Zero Emissions Bus Trials**

*Victoria's Bus Plan* includes the objective of 'introducing a cleaner, smarter fleet' and related actions. *Action 2* is to 'work with the bus industry to develop a pathway to a zero-emission fleet' and includes the following statement:

*We have started with the Victorian Government's \$20 million investment in a three-year trial of zero emissions bus technologies that aim to encourage industry collaboration and innovation as the bus fleet transitions to zero transmissions from 2025. The trials will inform the development of a shared transition road map addressing issues such as depot and charging infrastructure, fleet cascade plans, workforce upskilling and retraining as well as environmental outcomes, passenger expectations and commercial arrangements.*<sup>12</sup>

This action supported in practical terms by announcements from the Victorian Government, including:

- legislation requiring all new buses in Victoria to be zero emission vehicles from 2025 with the aim of ultimately replacing the State's 4000 bus fleet; and,
- the funding of a three-year trial of zero emissions bus technologies.<sup>13</sup>

### **Industry support for the course**

This course has been developed as part of an industry project with the Governing Steering Committee (as opposed to the Course Steering Committee in this application for accreditation) representing a consortium

<sup>11</sup> Hon Ben Carroll, MP, Minister for Public Transport, Victoria State Government, 'Mechanics Invited to Upskill and Work on Clean Vehicles', *Media Release*, 8 April 2021.

<sup>12</sup> Victoria State Government, Department of Transport, 'Victoria's Bus Plan', circa 18 April 2022, page 16, accessed 24 June 2022 at file:///C:/Users/au030339/Downloads/bus-reform-roadmap%20(9).pdf.

<sup>13</sup> The State of Victoria Department of Environment, Land, Water and Planning, 'Zero Emission Vehicle Roadmap', May 2021, accessed 25 August 2022 at [www.energy.vic.gov.au/\\_data/assets/pdf\\_file/0031/583726/Zero-emission-vehicle-roadmap.pdf](http://www.energy.vic.gov.au/_data/assets/pdf_file/0031/583726/Zero-emission-vehicle-roadmap.pdf).

comprised of representatives from the *AMWU Victoria Branch* and the major Victorian bus companies *Dysons*, *Kinetic*, *Ventura* and *CDC Victoria*. It is planned that the course will be delivered by *Bendigo Kangan Institute* across metropolitan and regional areas. The *Bus Association of Victoria* and the *Department of Education* are also represented on the project's Committee. The project also has significant support from throughout the bus industry, as evidenced by the support for the research into the knowledge and skills proposed for the course (see the *Industry research and consultation* section below).

### Industry research and consultation

Industry research and consultation was undertaken by the project team in an industry-wide on-line research exercise, and a series of industry focus groups held in bus industry depots in July 2022. The response to both exercises was very strong, with:

- 184 invitations to complete the survey distributed to bus industry individuals through the *AMWU Victoria Branch* and industry leaders, with an impressive return rate estimated at 37% (68 respondents); and,
- a further 32 industry representatives who attended focus groups, held in three bus industry depots, strongly endorsing the proposed content and suggesting additions and improvements.

The online research sought responses to a range of possible training content in a closed-end ranking question format (from 1 to 5, where 1 = Not relevant/valuable, and 5 = Extremely relevant/valuable) and yielded the following results:

- 68 bus industry workers from throughout Victoria responded to the survey
- average rating scores of **4.3/5** for the responses to the survey questions on a scale of 1-5 where 5 was 'extremely relevant/valuable'
- 97% of the respondents indicated that they would enrol in the proposed course.

Both pieces of research focused on:

- discussing and rating the importance and relevance of suggested content items
- identifying the demand for the course amongst participants
- identifying participants' delivery preference for the course between classroom/workshop, on-line or a combination of both.

The research showed a very strong demand for the course with almost unanimous acceptance of the proposed content.

Further information on both pieces of research can be seen in the *Gap Analysis Report* and the *Survey Monkey Report* for the *Delivering a Skilled Workforce for Victoria's Electric Buses Project*.

### Course Target Groups

The course is aimed at the following two groups of existing and new

workers in the bus industry:

- bus technicians, including diesel mechanics and automotive electricians, who require additional skills and knowledge to underpin working safely when servicing, maintaining and repairing BEB
- bus depot staff performing non-technical work with diesel buses to safely prepare BEB for operation.

### **Steering Committee**

The Steering Committee includes representation from the bus industry union, the employers' organisation and four major bus companies operating in Victoria:

- Jamie Purves (Chair) – AMWU Victoria Branch
- Vince Pepi - AMWU Victoria Branch
- Sam Distefano – Dyson Group
- Phil Barron – Ventura Bus
- Clint Stoermer – Kinetic Transport
- Darren Cottle – CDC Bus
- Tim Gangell – Bus Association Victoria
- Gavin Cribb - Bendigo Kangan Institute

In attendance:

- Tina Berghella - Accreditation expert
- Christopher Todd - Writer
- Sarah Ross - AMWU Victoria Branch
- Michális S. Michael - AMWU Victoria Branch

### **Summary of skills and knowledge outcomes from the course**

- Hazards, risks, risk controls and safe working procedures relevant to BEB in a bus depot including high voltage (HV).
- Pre-operational visual inspection of BEB using an inspection checklist, and recording and reporting the results.
- Hazards, risks, risk controls and safe working procedures for working with broken-down, damaged or compromised BEB, including high voltages, fire safety and flood safety.
- Hazards, risks, risk controls and safe work procedures for working with BEB batteries, including high voltage safety, voltage exposure safety and fire hazards.
- Hazards, risks, risk controls and safe work procedures for working with moving BEB.

This course:

- does not duplicate, by title or coverage, the outcomes of an endorsed training package qualification;

	<ul style="list-style-type: none"> <li>is not a subset of a single training package qualification that could be recognised through one or more statements of attainment or a skill set; and</li> <li><i>does not include units of competency additional to those in a training package qualification that could be recognised through statements of attainment in addition to the qualification.</i></li> </ul>
<b>3.2 Review for re-accreditation</b>	Not applicable
<b>4. Course outcomes</b>	<b>Standards 5.5, 5.6 and 5.7 AQTF 2021 Standards for Accredited Courses</b>
<b>4.1 Qualification level</b>	The course meets an identified industry need, but does not have the breadth, depth or volume of learning of a qualification.
<b>4.2 Foundation skills</b>	Foundation skills applicable to the outcomes of this course are identified in the unit of competency.
<b>4.3 Recognition given to the course (if applicable)</b>	Not applicable
<b>4.4 Licensing/regulatory requirements (if applicable)</b>	<i>Not applicable</i>

5. Course rules	Standards 5.8 and 5.9 AQTF 2021 Standards for Accredited Courses
<b>5.1 Course structure</b>	<p>To achieve award of 22624VIC Course in Introduction to Working with Battery Electric Buses the learner must successfully complete one unit listed below.</p> <p>There are no exit points to provide for vocational or educational outcomes.</p> <p>A Statement of Attainment will be issued for the course which will include the code and title of the unit of competency.</p> <p>There are no formal prerequisites for this course.</p> <p>There are no units of competency imported from endorsed training packages or other accredited courses.</p>

Unit of competency code	Unit of competency title	Field of Education code (six-digit)	Pre-requisite	Nominal hours
<b>Core units</b>				
VU23431	Work safely with battery electric buses	030503	NA	20
<b>Total nominal hours</b>				20

Standard 5.11 AQTF 2021 Standards for Accredited Courses	
<b>5.2 Entry requirements</b>	<p>There are no mandatory entry requirements for this course.</p> <p>Learners enrolling in 22624VIC Course in Introduction to Working with Battery Electric Buses are best equipped to successfully undertake the training if they have language, literacy and numeracy that align to Level 2 of the Australian Core Skills Framework (ACSF).</p> <p>Learners with language, literacy, and numeracy skills at levels lower than suggested above may require additional support to successfully undertake this course.</p>

6. Assessment	Standard 5.12 and 5.14 AQTF 2021 Standards for Accredited Courses
<b>6.1 Assessment strategy</b>	<p>All assessment, including Recognition of Prior Learning (RPL), must be compliant with the requirements of:</p> <ul style="list-style-type: none"> <li>• Standard 1 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guidelines 4.1 and 4.2 of the VRQA Guidelines for VET Providers</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>• the Standards for Registered Training Organisations 2015 (SRTOs)</li> </ul>

## 6. Assessment

## Standard 5.12 and 5.14 AQTF 2021 Standards for Accredited Courses

or

- the relevant standards and Guidelines for RTOs at the time of assessment.

Assessment strategies must therefore ensure that:

- all assessments are valid, reliable, flexible and fair;
- learners are informed of the context and purpose of the assessment and the assessment process;
- feedback is provided to learners about the outcomes of the assessment process and guidance is provided for future options; and
- time allowance to complete a task is reasonable and specified to reflect the context in which the task takes place.

Assessment strategies must be designed to:

- cover a range of skills and knowledge required to demonstrate achievement of the course aims;
- collect evidence on a number of occasions to suit a variety of contexts and situations;
- be appropriate to the knowledge, skills, methods of delivery, and needs and characteristics of learners;
- assist assessors to consistently interpret evidence;
- recognise existing skills; and
- be equitable to all learners.

Appropriate assessment methods can include a combination of the following:

- direct observation of performance of skills;
- oral and/or written questioning;
- testimony from a competent person e.g. supervisor;
- inspection of final process outcomes;
- documented work-based evidence; and
- demonstration of practical skills.

The unit of competency may be assessed on-the-job, off-the-job or a combination of both. Where assessment occurs off-the-job, simulation must reflect a realistic BEB operational workplace context.

Mandated assessment resources apply to the unit and are included in the Assessment Conditions of the unit to ensure that assessment takes place in a realistic BEB operational workplace context.

- Due to the high risks associated with broken-down, damaged or compromised BEB, assessment involving these must be simulated.

<b>6. Assessment</b>	<b>Standard 5.12 and 5.14 AQTF 2021 Standards for Accredited Courses</b>
<b>6.2 Assessor competencies</b>	<p>Assessment must be undertaken by a person or persons in accordance with:</p> <ul style="list-style-type: none"> <li>Standard 1.4 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guidelines 3 of the VRQA Guidelines for VET Providers,</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>the Standards for Registered Training Organisations 2015 (SRTOs),</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>the relevant standards and Guidelines for RTOs at the time of assessment.</li> </ul>
<b>7. Delivery</b>	<b>Standards 5.12, 5.13 and 5.14 AQTF 2021 Standards for Accredited Courses</b>
<b>7.1 Delivery modes</b>	<p>This course is available for full- or part-time study. Providers should endeavour to be flexible in the way the training is delivered to ensure they meet the needs of learners and their employers.</p> <p>The course aims to develop competence within a BEB operational workplace context. Practical demonstrations and the opportunity for the application of skills provide the most suitable strategy to reflect the objectives of the course.</p> <p>On-the-job delivery may include providing opportunities for learners to provide evidence of competence while practising skills and applying knowledge in their bus depot workplace when performing tasks between formal training sessions under workplace supervision.</p> <p>Where delivery occurs off-the-job, conditions must reflect a realistic BEB operational workplace context and include realistic bus depot scenarios.</p> <p>Delivery modes may include:</p> <ul style="list-style-type: none"> <li>face to face classroom-based training</li> <li>workplace-based learning</li> <li>self-paced learning</li> <li>blended learning</li> </ul> <p>Delivery should allow for self-directed learning and development together with independent judgement and accountability for outputs.</p>
<b>7.2 Resources</b>	<p>The following resources must be made available:</p> <ul style="list-style-type: none"> <li>workplace procedures for depot staff that reflect OEM instructions and comply with Australian Standards for working safely with electric vehicles</li> <li>real or simulated bus depot</li> </ul>

<b>7. Delivery</b>	<b>Standards 5.12, 5.13 and 5.14 AQTF 2021 Standards for Accredited Courses</b>
	<ul style="list-style-type: none"> <li>• real or simulated BEB charging station</li> <li>• real or simulated BEB for inspection</li> <li>• depot-standard pre-operational inspection checklist</li> <li>• personal protective equipment (PPE) and equipment for inspecting and charging BEB</li> <li>• scenarios of broken-down, damaged or compromised BEB.</li> </ul> <p><b>Trainer competence</b></p> <p>Training must be undertaken by a person or persons in accordance with:</p> <ul style="list-style-type: none"> <li>• Standard 1.4 of the AQTF: Essential Conditions and Standards for Initial/Continuing Registration and Guideline 3 of the VRQA Guidelines for VET Providers</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>• the Standards for Registered Training Organisations 2015 (SRTOs)</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>• the relevant standards and Guidelines for RTOs at the time of assessment.</li> </ul>
<b>8. Pathways and articulation</b>	<b>Standard 5.10 AQTF 2021 Standards for Accredited Courses</b>
	There are no formal articulation arrangements in place at the time of accreditation.
<b>9. Ongoing monitoring and evaluation</b>	<b>Standard 5.15 AQTF 2021 Standards for Accredited Courses</b>
	<p>This course is maintained and monitored by the course copyright owner, The State of Victoria (Department of Jobs, Skills, Industry and Regions).</p> <p>The Automotive Industries Curriculum Maintenance Manager will be responsible for the ongoing monitoring and maintenance of the course.</p> <p>A formal review of the course design and content will take place at the mid-point of the accreditation period. Feedback will be sought from industry, learners, providers offering the course, and other relevant stakeholders as part of the review process.</p> <p>Recommendations for any significant changes will be reported to the Victorian Registration and Qualification Authority (VRQA).</p>



## Section C – Units of competency

The following unit of competency has been developed for this course and is attached in this section:  
VU23431 Work safely with battery electric buses.

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<b>Unit code</b>	<b>VU23431</b>
<b>Unit title</b>	<b>Work safely with battery electric buses</b>
<b>Application</b>	<p>This unit describes the skills and knowledge required to perform non-technical tasks to prepare battery electric buses (BEB) for operation. It includes identifying hazards and risks, controlling risks, performing pre-operational visual inspections of BEB and controlling the risks associated with broken-down, damaged or compromised BEB.</p> <p>The unit applies to bus depot staff and bus technicians undertaking non-technical work with BEB.</p> <p>No occupational licensing, legislative or certification requirements apply to this unit at the time of publication.</p>
<b>Pre-requisite Unit(s)</b>	Not Applicable.
<b>Competency Field</b>	Not Applicable.
<b>Unit Sector</b>	Not Applicable.

<b>Element</b>		<b>Performance Criteria</b>	
Elements describe the essential outcomes of a unit of competency.		Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the assessment requirements.	
1	Prepare to work safely with BEB.	1.1	Access and follow workplace procedures for working safely with BEB.
		1.2	Identify and report hazards and risks associated with working with BEB in a bus depot, including high voltage (HV) systems, according to workplace procedures.
2	Prepare BEB for operation.	2.1	Access and follow workplace procedures for preparing BEB for operation.
		2.2	Implement risk controls for BEB including stationary BEBs, moving BEBs, and broken-down, damaged or compromised BEBs.
		2.3	Select and fit personal protective equipment (PPE).
		2.4	Conduct pre-operational visual inspections of BEB according to workplace procedures.
		2.5	Report identified problems, faults and malfunctions in BEB according to workplace procedures.

## Range of Conditions

Not Applicable

## Foundation Skills

Foundation Skills describe the language, literacy, numeracy and employability skills that are essential to performance.

**Foundation skills essential to performance and not explicit in the performance criteria must be assessed.**

Skill	Description
Reading skills to:	<ul style="list-style-type: none"> <li>• read workplace procedures</li> <li>• read safety requirements</li> <li>• read simple information about job requirements</li> <li>• read inspection checklists</li> <li>• read workplace signs.</li> </ul>
Writing skills to:	<ul style="list-style-type: none"> <li>• record information on inspection checklists</li> <li>• complete simple workplace reports, including on hazards and risks.</li> </ul>
Numeracy skills to:	<ul style="list-style-type: none"> <li>• read and record numerical data from BEB instruments during vehicle visual inspections.</li> </ul>
Digital literacy skills to:	<ul style="list-style-type: none"> <li>• interpret digital readouts as part of bus inspection processes.</li> </ul>

## Unit Mapping Information

New unit, no equivalent unit.

## Assessment Requirements

<b>Title</b>	Assessment Requirements for VU23431 Work safely with battery electric buses
<b>Performance Evidence</b>	<p>Candidates must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:</p> <ul style="list-style-type: none"> <li>• perform a pre-operational visual inspection of a battery electric bus (BEB) that includes:             <ul style="list-style-type: none"> <li>◦ using a pre-operational inspection checklist</li> <li>◦ recording the inspection results to the standard expected in a bus depot</li> </ul> </li> <li>• identify and report three BEB hazards and risks associated with working in a bus depot</li> <li>• identify and report three BEB hazards and risks associated with working with a broken-down, damaged or compromised BEB.</li> </ul>
<b>Knowledge Evidence</b>	<p>Candidates must be able to demonstrate essential knowledge required to effectively perform the tasks outlined in elements and performance criteria of this unit, and to manage the tasks and contingencies in the context of the work role. This includes knowledge of:</p> <ul style="list-style-type: none"> <li>• workplace procedures for working safely in a bus depot with BEB:             <ul style="list-style-type: none"> <li>◦ required PPE for bus depot staff</li> <li>◦ working safely with HV BEB</li> <li>◦ preparing BEB for operation</li> <li>◦ working with moving BEB in a bus depot, including:                 <ul style="list-style-type: none"> <li>– operating ‘instant’ torque electric motors</li> <li>– accelerating and braking safely</li> <li>– driving buses with no engine noise in a bus depot</li> </ul> </li> <li>◦ working with broken-down, damaged or compromised BEB</li> <li>◦ safely charging BEB in a bus depot:                 <ul style="list-style-type: none"> <li>– required PPE</li> <li>– hazards, risks and risk controls</li> </ul> </li> <li>◦ identifying and reporting hazards and risks</li> <li>◦ isolation including ‘test and tag’ and quarantine for broken down, damaged or compromised BEB</li> </ul> </li> <li>• hazards, risks and risk controls in a bus depot associated with stationary and moving BEB</li> <li>• components and feedback systems of BEB that contribute to:             <ul style="list-style-type: none"> <li>◦ hazards and risks to bus depot staff</li> <li>◦ maintaining safety of bus depot staff</li> </ul> </li> <li>• depowering and repowering processes conducted by bus technicians in managing BEB in a bus depot</li> <li>• colour-coding of high voltage and low voltage systems and cabling in BEB</li> <li>• locations of High Voltage (HV) currents on BEB that put bus depot staff at risk</li> <li>• hazards, risks and risk controls associated with working with batteries and HV systems in BEB in a bus depot, including dangers of serious or fatal injury from:             <ul style="list-style-type: none"> <li>◦ direct contact with HV current circuits, including shocks and arc flash from stored or generated electrical energy</li> <li>◦ contact with HV current in a flooded vehicle</li> </ul> </li> </ul>

## Assessment Requirements

- fire in the rechargeable energy storage (battery) systems
- contact with battery electrolyte and electrolyte vapours
- exposure to powerful magnets contained in electric vehicle components
- roles of bus depot staff in battery care, prevention of battery fire and reporting of hazards, risks and risk controls in BEB
- using feedback from BEBs dashboard instruments
- protecting rechargeable energy storage systems (RESS) from overheating from direct sun during charging
- visual checks of BEB listed in pre-operational procedures and checklists, including of:
  - power and propulsion systems
  - RESS
  - air conditioning systems for cooling RESS
  - high voltage energy storage systems
  - low voltage systems
  - warning systems
  - overall condition of cabling and components
- hazards, risks and risk controls associated with broken down, damaged or compromised BEB, including:
  - high voltage
  - flood
  - fire.

## Assessment Conditions

Competency is to be assessed in the workplace or a simulated environment that accurately reflects a real workplace setting.

Assessment must include direct observation of tasks under workplace or simulated workplace conditions.

Assessment involving broken-down, damaged or compromised BEB must be simulated.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- plain English workplace procedures for depot staff that reflect OEM instructions and comply with Australian Standards for working safely with electric vehicles
- real or simulated bus depot
- real or simulated BEB charging station
- real or simulated BEB for inspection
- depot-standard pre-operational inspection checklist
- personal protective equipment (PPE) and equipment for inspecting and charging BEB
- scenarios of broken-down, damaged or compromised BEB.

### Assessor requirements

No specialist vocational competency requirements for assessors apply to this unit.