



Australian Government

AURBTJ003 Design and build bicycle wheels

Release: 1

AURBTJ003 Design and build bicycle wheels

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to design and build bicycle wheels with different hub, spoke and rim configurations. It involves preparing for the work, selecting and using specialist tools and equipment to design and carry out the building and testing of bicycle wheels, and completing workplace processes and documentation.

It applies to those working in the bicycle retail, service and repair industry.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Competency Field

Bicycle

Unit Sector

Technical - Wheels and Tyres

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Prepare to design and build bicycle wheels	1.1 <i>Job requirements</i> are determined from workplace instructions, including wheel materials, components and spoke patterns 1.2 Bicycle <i>wheel design</i> requirements and manufacturer specifications are researched and interpreted 1.3 Bicycle wheel design and specifications are confirmed with customer

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
2. Prepare to build bicycle wheels	2.1 <i>Wheel components</i> are checked against specifications and inspected for quality prior to build 2.2 Bicycle build is planned, including build sequence and post-build testing process, to use time efficiently 2.3 Hazards associated with the work are identified and risks are managed 2.4 Tools and equipment, including personal protective equipment (PPE), are selected and checked for serviceability 2.5 Work area and wheels, components and materials are prepared
3. Build and test bicycle wheels	3.1 Bicycle wheels are built according to job and customer requirements, work plan, and <i>safety and environmental requirements</i> 3.2 Bicycle wheel hubs and rims are selected and spoke lengths calculated 3.3 Bicycle wheel spokes are laced and tensioned according to manufacturer specifications and workplace instructions 3.4 Built bicycle wheels are checked for symmetry and tested for trueness against specifications 3.5 Results and quality issues are reported to authorised personnel as required
4. Complete work processes	4.1 Final inspection is made to ensure work meets workplace expectations and bicycle is presented ready for use 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected and stored 4.3 Tools and equipment are checked, reported if faulty, and stored according to workplace procedures 4.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

Skills	Description
Learning skills to:	locate appropriate sources of information efficiently.

Skills	Description
Writing skills to:	legibly and accurately fill out workplace documentation, including material and parts lists.
Oral communication skills to:	ask questions to clarify instructions and requirements, including with customers and suppliers.
Numeracy skills to:	- interpret stock codes - identify wheel and hub sizes and spoke numbers - use basic mathematical operations to calculate: - spoke lengths - settings and adjustments to wheel and hub components.
Problem solving skills to:	- identify: - potential faults in wheel design - technical and procedural problems to avoid waste.
Technology skills to:	use specialist bicycle tools and equipment in line with workplace procedures.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Job requirements</i> must include:	- spoke patterns - wheel components - wheel materials.
<i>Wheel design</i> must include:	- hubs, spoke and rim selection 32 hole three-cross spoke pattern - disc and non-disc brake specific patterns - symmetrical and asymmetrical patterns - wheel dynamics and loading.
<i>Wheel components</i> must include:	- steel, aluminium and composite material rims - high flange, low flange and integrated brake hubs - metal and composite hub material - steel, aluminium and composite spoke material - straight gauge, double butted and bladed spokes - spoke nipples - spoke lacing patterns.

<i>Safety and environmental requirements</i> must include:	• work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: • manually handling bicycle wheels • identifying workplace hazards • using tools and equipment, including PPE • environmental requirements, including procedures for disposing of waste materials.
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Unit Mapping Information

Equivalent to AURBTJ3003 Design and build bicycle wheels

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURBTJ003 Design and build bicycle wheels

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standard defined in this unit's elements, performance criteria, range of conditions and foundation skills:

- design and build three different bicycle wheels to specification, with each wheel including:
 - lacing a 32 hole three-cross spoke pattern
 - disc and non-disc brake specific patterns.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to designing and building bicycle wheels, including procedures for:
 - manually handling bicycle wheels
 - identifying workplace hazards
 - using tools and equipment, including personal protective equipment (PPE)
- environmental requirements, including procedures for disposing of waste materials
- key bicycle terminology relating to wheel build for different bicycle types
- key features to be considered in wheel design:
 - hubs, spoke and rim selection
 - 32 hole three-cross spoke pattern
 - disc and non-disc brake specific patterns
 - symmetrical and asymmetrical patterns
 - wheel dynamics and loading
- wheel and hub mechanical principles
- bicycle wheel components specified in the range of conditions and their specifications

- types and use of tools and equipment used to design and build bicycle wheels
- techniques for designing and building bicycle wheels, including:
 - material used in bicycle wheels
 - lacing and spoke pattern
 - calculating spoke lengths
 - assembly, truing and tensioning of wheels
 - symmetrical and asymmetrical patterns of wheels
 - wheel dynamics and loading
 - torque measurement and adjustment of wheels
 - wheel and hub testing procedures.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

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

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the bicycle wheels they have designed and built, e.g. build orders.

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

The following resources must be made available:

- bicycle workplace or simulated workplace
- workplace instructions detailing job requirements
- manufacturer and technical bicycle wheel specifications
- PPE required to design and build bicycle wheels
- wheel components specified in the range of conditions
- three different bicycle wheels as specified in the performance evidence requiring a complete build
- tools and equipment appropriate for designing and building bicycle wheels.

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