

AS 7516:2014



Axle Bearings



Rolling Stock Standard



This Australian Railway Standard AS 7516 Axle Bearings was prepared by the RISSB Development Group. It was signed off by the Development Group and the Rolling Stock Standing Committee in October, 2014 and subsequently by the Development Advisory Board (DAB) in October, 2014. The DAB confirmed that the process used to develop the standard was in accordance with the RISSB accredited development process. On November 10, 2014 the RISSB Board approved the Standard for release.



Kevin Taylor
Chief Executive Officer
Rail Industry Safety and Standards Board

The following organisations were represented on the RISSB Development Group:

UGL Limited	Gemco Rail	Marais Consulting Engineers
Hardchrome Engineering	Transport for NSW	Downer
Bradken	Public Transport Authority of Western Australia	Bombardier Transportation

This standard was issued on two occasions for open review and was independently validated before being signed off and the approvals granted.

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Document Control

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Standard Change Procedures

RISSB maintains the master for this document and publishes the current version on the RISSB website.

Any changes to the content of this publication require the version number to be updated.

Changes to this publication must be approved according to the procedure for developing management system documents.

RISSB will identify and communicate changes to this publication.

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1 Introduction

1.1 Purpose

This document identifies the mandatory and recommended requirements for axle bearing design, use, maintenance and overhaul on Rolling Stock.

The requirements in this document aim to ensure maximum safety of the general public, passengers, workers and property against the Rolling Stock Hazards that may arise due to failure of axle bearings, axleboxes and adaptors.

1.2 Scope

This document applies to all new and existing Rolling Stock used in the Australian railway industry.

Sections 2 and 3 apply to new rolling stock.

The document covers the design, maintenance and overhaul of axle bearings used on Rolling Stock.

Bearings that are mounted on the axle but do not transmit the main weight of the vehicle to the wheelset are not covered by this standard.

Operation of rolling stock is not covered.¹

Rolling stock used on light rail, cane railway and monorail networks is not covered.²

This standard applies to axle bearings designed for operating speeds up to and including 200 km/hr.

1.3 Compliance

There are two types of control contained within RISSB Standards:

- (a) mandatory requirements
- (b) recommended requirements

Each of these types of control address hazards that are deemed to require controls on the basis of existing Australian and international Codes of Practice and Standards.

A **mandatory** requirement is a requirement that the standard provides as the only way of treating the hazard.

Mandatory requirements are identified within the text by the term shall.

A **recommended** requirement is one where the standard recognises that there are limitations to the universal application of the requirement and that there may be circumstances where the control cannot be applied or that other controls may be appropriate or satisfactory, subject to agreement with the Rolling Stock Operator, Rail Infrastructure Manager and/or Rail Safety Regulator.

Recommended requirements are to be considered when compliance with the standards is being assessed.

Recommended requirements are identified within the text by the term should.

¹ Operation of rolling stock is covered in the Operations section of the Code.

² Currently excluded.

Hazards addressed by this standard are included in an appendix. Refer to the RISSB website for the latest Hazard Register Guideline: www.rissb.com.au

1.4 Referenced documents

The following documents are referred to in this Standard:

- (a) AS 2729 / ISO 281 Rolling bearings - Dynamic load ratings and rating life
- (b) AS 3890 Rolling bearings - System life and reliability
- (c) AS 4292 Railway safety management
- (d) AS 7501 Railway rolling stock - Rolling stock compliance certification
- (e) AAR Field Manual
- (f) AAR Manual of Standards and Recommended Practices - Sections H and H-II
- (g) AREMA Communications & Signals Manual - Volume 2
- (h) ATSB report 2003/002

Referenced documents are applicable as they become available.

1.5 Definitions

AAR: Association of American Railroads³

Acoustic Detector: Lineside system used to detect suspected defective axle bearings that are abnormally noisy (RailBAM).

AREMA: American Railway Engineering and Maintenance of Way Association⁴

Axle Bearings: Bearings mounted on the axle to transmit the main weight of the vehicle directly to the wheelset. Excludes bearings mounted on the axle to support traction motors, final drives etc.

Axlebox Bearings: Axle bearings mounted in an axlebox, that are set, lubricated and sealed after assembly on the axle. The axle bearing is not visible without removal of the axlebox or axlebox cover, and require lubrication throughout service life.

Cane Railway Network: A railway system dedicated to hauling harvested sugar cane from farms to a raw sugar factory. Typically 610mm gauge.

Field Lubricated (FL) Bearings: Bearings that require lubricant to be added during the service period.⁵

Freight Rolling Stock: Hauled rolling stock used to transport goods, materials, etc.

Gross Mass Loading: The maximum static load a bearing will experience during operation. Equal to the maximum vehicle mass (excluding wheelsets) divided by the number of axle bearings.

Hot Axlebox Detector (HBD or HABD): Wayside or train mounted system used to detect suspected defective axle bearings that are abnormally hot.

Infrastructure Maintenance Rolling Stock: Track Machines and Road-Rail Vehicles. Also known as On Track Vehicles.

³ <http://www.aar.org/>

⁴ <http://www.arema.org/>

⁵ Field lubricated package bearings are to be superseded by non field lubricated assemblies.

Life Expectancy: The calculated L10 life rating, given in kilometres - refer to AS 2729 / ISO 281, or equivalent.

Light Rail Network: A passenger-carrying railway system operating with trams or other similar shorter length, lower speed and lower axle-load self-propelled vehicles. Typically used in urban areas and often having a shared right-of-way with road traffic.

Locomotive Rolling Stock: Self-propelled, non-passenger-carrying railway vehicles used for hauling or propelling other (typically freight or passenger) rolling stock.

Maintenance: Actions carried out during the service period to keep the axle bearing in a fit for purpose condition.

Major Derailment: All derailments exceeding the limits defining Minor Derailment.

Minor Derailment: Rolling Stock derailed for less than sixty (60) metres and less than sixteen (16) kilometres per hour.⁶

Monorail Network: A passenger-carrying system in which vehicles travel over a single broad beam (rather than two narrow rails connected by sleepers as with conventional railway rolling stock).

Noisy Bearing: Any bearing with unusual noise, roughness or catches in rotation when turned by hand, for at least one full rotation, or identified by wayside monitoring equipment.⁷

Non Field Lubricated (NFL) Bearings: Bearings that do not require any lubricant to be added during the service period.

Passenger Rolling Stock: Rolling stock carrying people and facilities for these people. Excludes locomotive and infrastructure maintenance rolling stock.

Overhaul: Actions carried out at the end of the service period to return the item to a condition that should give reliable operation for a further full service period.

Overheated Bearing: Any bearing that has run hotter than normal limits or produced visible signs of overheating such as smoke, noise or fire, or any bearing running hotter than other bearings on same vehicle.

Package Axle Bearings: A single packaged (or cartridge) unit, containing all the bearing assembly parts, pre-set, lubricated and sealed for assembly on the axle. Also known as a package journal bearing, or packaged unit bearing.

Plain Axle Bearings: Bearings using sliding motion between the moving load-bearing surfaces.

Rail Infrastructure Manager: The person or body responsible by reason of ownership, control or management, for the construction and maintenance of track, civil and electric traction infrastructure, or the construction, operation or maintenance of train control and communication systems, or a combination of these; or a person or body acting on its behalf.

Regulator: A government body responsible for ensuring compliance with particular laws, acts, regulations etc, e.g. rail safety regulator.

Roller Axle Bearings: Bearings using rolling elements between the moving load-bearing surfaces (cylindrical, spherical and taper rollers). Also known as a roller journal bearing.

⁶ Field lubricated package bearings are to be superseded by non field lubricated assemblies

⁷ Normal roller contact against the cage will make a clicking noise. This noise is acceptable.