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AUSTRALIAN RAIL INDUSTRY
STANDARDS ORGANISATION

AS 7510.1

Braking Systems – Part 1: Locomotive Rolling Stock

STANDARDS



Advancing safety and productivity

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Development of this Standard was prepared by an Australian Rail Industry Standards Organisation (ARISO) Development Group consisting of representatives from the following organisations:

Pacific National, Aurizon, Fortescue, Queensland Rail, KiwiRail and Transport for NSW.

The Rolling Stock Standing Committee verified that ARISO's accredited process was followed in developing the product, before the ARISO Board approved the document for publication.

ARISO wishes to acknowledge the positive contribution of subject matter experts in the development of this Standard. Their efforts ranged from membership of the Development Group through to individuals providing comments on a draft of the Standard during the open review.

I commend this Standard to the Australasian rail industry as it represents industry good practice and has been developed through a rigorous process.



Alan Fedda
Chief Executive Officer
Australian Rail Industry Standards Organisation

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Approval

Name	Date
Australian Rail Industry Standards Organisation Board	18 June 2026

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Preface

This document was prepared by the Braking Systems – Part 1: Locomotive Rolling Stock Development Group, overseen by the ARISO Rolling Stock Standing Committee.

The major changes in this revision are as follows:

- (a) Clarification and expansion of scope and core braking requirements, including strengthened fail-safe principles, emergency functionality and interoperability with existing systems.
- (b) Enhancement of technical requirements for pneumatic systems, components and interfaces to improve reliability, consistency and cross-network compatibility.
- (c) Introduction of more detailed performance criteria, including braking distances, pressure/timing tolerances and calculation methodologies aligned with contemporary and international practices.
- (d) Expansion of validation, testing, maintenance and lifecycle requirements, supported by improved guidance, appendices and hazard identification.

Objective

The objective of this document is to provide safety benefits in that proper braking performance contributes to the prevention of collisions or derailments of railway rolling stock by providing controls for known hazards.

This document describes minimum standards for brake performance, features and compatibility for the braking systems of locomotives.

This document is intended to compliment the rolling stock compliance certification process outlined in AS 7501, including new and modified locomotives.

Compliance

There are four types of provisions contained within Australian Standards developed by ARISO:

- (e) Requirements.
- (f) Recommendations.
- (g) Permissions.
- (h) Constraints.

Requirements – it is mandatory to follow all requirements to claim full compliance with the Standard. Requirements are identified within the text by the term ‘shall’.

Recommendations – do not mention or exclude other possibilities but do offer the one that is preferred. Recommendations are identified within the text by the term ‘should’.

Recommendations recognize that there could be limitations to the universal application of the control, i.e. the identified control is not able to be applied or other controls are more appropriate or better.

Permissions – conveys consent by providing an allowable option. Permissions are identified within the text by the term ‘may’.

Constraints – provided by an external source such as legislation. Constraints are identified within the text by the term ‘must’.

For compliance purposes, where a recommended control is not applied as written in the standard it could be incumbent on the adopter of the standard to demonstrate their actual method of controlling the risk as part of their WHS or Rail Safety National Law obligations. Similarly, it could also be incumbent

on an adopter of the standard to demonstrate their method of controlling the risk to contracting entities or interfacing organisations where the risk may be shared.

ARISO Standards identify known hazards relevant to the railway industry. Appendix B provides a non-exhaustive list of hazards relevant to the scope of this Standard.

Appendices in ARISO Standards may be designated either “normative” or “informative”. A “normative” appendix is an integral part of a Standard and compliance with it is a requirement, whereas an “informative” appendix is only for information and guidance.

Commentary

Commentary C Preface

This document includes a commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by ‘C’ preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the document.

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Section 1 Scope and general

1.1 Scope

This document applies to locomotives that are:

- (a) new;
- (b) modified affecting braking system compliance; or
- (c) to operate in a network in which this class has not previously operated.

Commentary C1.1-1

Existing locomotives could have braking systems different to this document due to the age of fleets and the previous organizational structures (e.g., fully-integrated state government owned and operated railways). These differences could be a result of design to earlier standards such as previous versions of AS 7510.1, the Railways of Australia manual or legacy standards from prior organizational structures.

It is also recognized that modifications to existing locomotives only affect some requirements and the RSO may deem that full compliance with the requirements of this document not practicable.

Examples of such modifications are a change of end cock, installation of a different handbrake or replacement of a legacy brake valve with an updated/modern version.

The derogation process as defined in AS 7501 is recommended for assessing non-conformances to mandatory requirements where it is deemed not practicable to change the design in order to comply with the requirements.

This scope of this document covers:

- (d) the design and construction of brake systems including automatic air brake and ECP brake systems with a standard brake pipe pressure of 500 kPa; and
- (e) the maintenance of the brake systems including automatic air brake and ECP brake systems.

Commentary C1.1-2

Some networks do not use the standard brake pipe pressure of 500 kPa (e.g., New Zealand uses 550 kPa, and Pilbara railways use 620 kPa). In such cases, some of the requirements of this document do not apply, but those which do can be applied to such networks as deemed appropriate.

Similarly, the pin numbers for train lines specified in this document are as previously defined in RoA Table 13.5A, reproduced in this document as Appendix Table A-2 in Appendix A. While these are mandatory for the NNI, some captive fleets use different pins. Refer to the relevant RIM.

Locomotives and trains that use standard, unmodified AAR pneumatic brake equipment are not covered and should refer to the relevant AAR standards.

The operation of locomotives, considering network safeworking rules and route standards, is not covered.

This document is not specifically intended to cover locomotives used on cane railways, heritage locomotives or specialist maintenance/rescue locomotives used on unmanned metro systems, but items from this document can be applied to such systems as deemed appropriate by the relevant RSO and/or RIM.