

ARiSO

AUSTRALIAN RAIL INDUSTRY
STANDARDS ORGANISATION

AS 7521

Interior Crashworthiness

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:

Metro Trains Melbourne, PTA WA, Transport for NSW, Queensland Rail, and UGL Ltd.

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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2026	10 September 2026	This document has been reviewed to ensure it remains relevant and applicable. The latest review assessed the content, confirming that while updates were made to align with current industry practices, technologies, and regulatory requirements, the original authorship and copyright have been acknowledged as required.

Approval

Name	Date
Australian Rail Industry Standards Organisation Board	10 September 2026

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Preface

This document was prepared by the Interior Crashworthiness Development Group, overseen by the ARISO Rolling Stock Standing Committee.

The major changes in this revision are as follows:

- Establishment of a comprehensive Secondary Impact Assessment framework requiring assessment of occupant injury risks throughout all accessible areas of rolling stock.
- Enhanced alignment with current rolling stock crashworthiness, access, egress, visibility and international rail safety standards, including the AS 7520 series and GMRT2100.
- Expanded and more detailed requirements for interior components including seating, tables, occupant restraints, doors, partitions, grab rails, luggage stowage, gangways and cab interiors.
- Strengthened glazing and window requirements, including laminated safety glass, impact performance criteria, emergency egress provisions and windscreen safety requirements.
- Increased focus on reducing occupant injury through improved seating arrangements, energy-absorbing interior design, management of free-flight distances and occupant restraint measures.
- Introduction of enhanced controls for loose items, equipment, luggage and hazardous materials to minimize projectile and secondary impact risks during collisions and derailments.
- Adoption of a more explicit risk and hazard-based approach, including consideration of electrical, thermal, pressurized-system and accessibility-related hazards, supported by a dedicated hazard register.

Objective

The objective of this document is to set the minimum requirements for the interiors of rolling stock to minimize the risk of injury during derailments, collisions and accidents.

This document contributes to the management of the following risks:

- (b) Individual striking or being struck by surfaces, structures or objects.
- (c) Contact with hot, electrical, chemical or hazardous substances.

Compliance

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

- (a) Requirements.
- (b) Recommendations.
- (c) Permissions.
- (d) 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’.

Using 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.

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

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Section 1 Scope and general

1.1 Scope

This document applies to all rolling stock (including locomotives and rail-bound track maintenance machines) intended to carry passengers as well as individuals carrying out their duties or resting.

This document applies to rolling stock:

- (a) entering service after the published date of this document; or
- (b) interior components undergoing major modifications or replacement with new designs after the published date of this document.

This document does not apply to heritage rolling stock and rolling stock operating on cane railways, light rail vehicles and road rail vehicles.

The requirements for car body structural crashworthiness are detailed in AS 7520 (all parts).

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document:

- AS 2080:2019, *Safety glazing for land vehicles*
- AS 2208:2023, *Safety glazing materials in buildings*
- AS 7520.1:2025, *Rolling Stock Body Structural Requirements – Part 1: Locomotive*
- AS 7520.3:2025, *Rolling Stock Body Structural Requirements – Part 3: Passenger*
- AS 7520.4:2023, *Body Structural Requirement – Part 4: Infrastructure Maintenance*
- AS 7522:2025, *Access and Egress*
- AS 7531:2023, *Rolling Stock Lighting and Visibility*
- GMRT2100 Iss 6.1, *Rail Vehicle Structures and Passive Safety* (2021)
- GMGN2687 Iss 1, *Guidance on Rail Vehicle Interior Structure and Secondary Structural Elements* (2010)
- 49 CFR Part 223, *Safety Glazing Standards—Locomotives, Passenger Cars and Cabooses*, Federal Railroad Administration (FRA), U.S. Department of Transportation
- Disability Discrimination Act 1992 (Cth)

NOTE:

Documents for informative purposes are listed in a Bibliography at the back of the Standard.

1.3 Defined terms and abbreviations

For the purposes of this document, the following terms and definitions apply:

1.3.1

bay seating

facing seats

face-to-face seating

seats with the fronts or faces toward each other