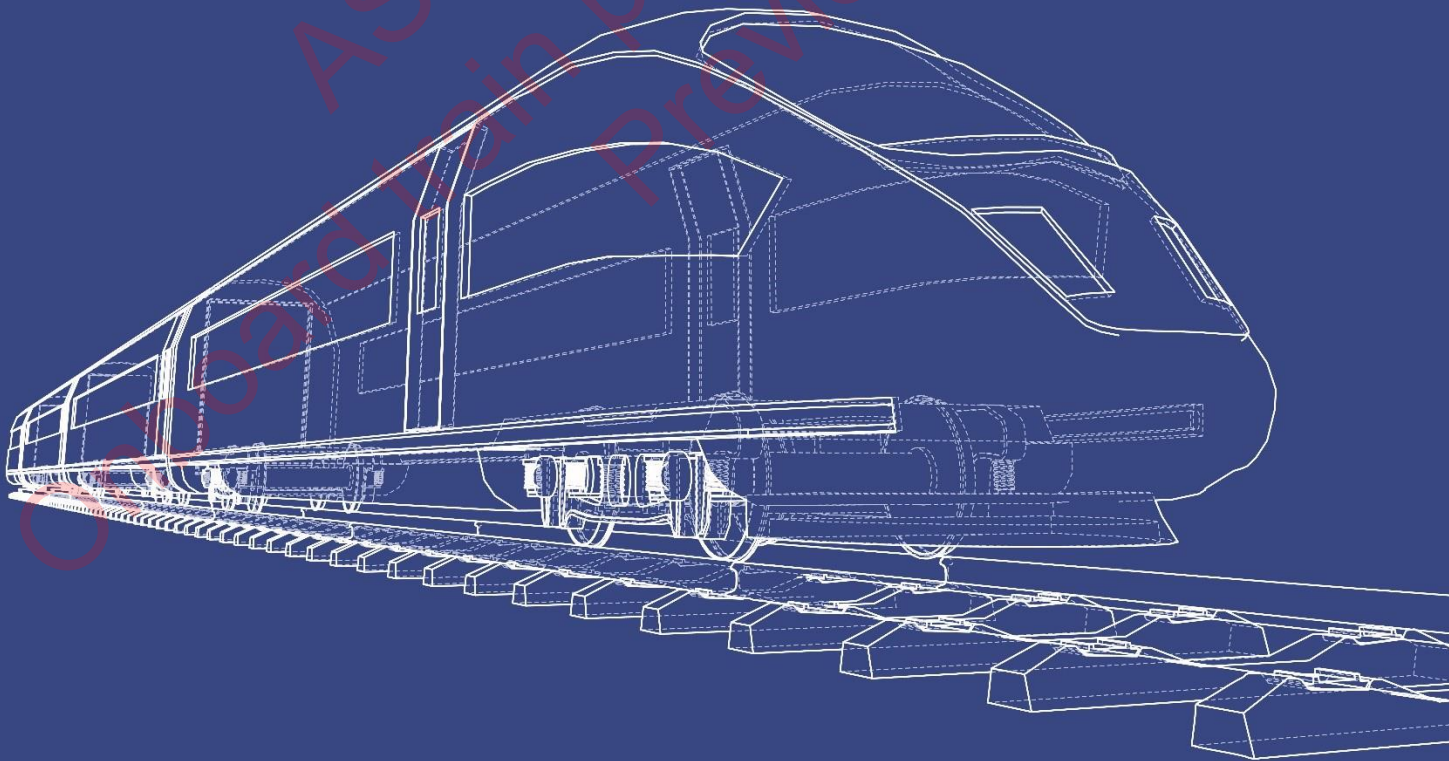


Onboard train protection systems

RiSSB
RAIL INDUSTRY SAFETY AND STANDARDS BOARD

Rolling Stock Standard



This Australian Standard® AS 7511 Onboard train protection systems was prepared by a Rail Industry Safety and Standards Board (RISSB) Development Group consisting of representatives from the following organisations:

Metro Trains Melbourne	Pacific National	TfNSW
Queensland Rail	Aurizon	PTV
RTBU	DPTI	Sydney Trains

The Standard was approved by the Development Group and the Rolling Stock Standing Committee in May, 2020. On June 01, 2020 the RISSB Board approved the Standard for release.

This standard was issued for public consultation and was independently validated before being approved.

Development of the Standard was undertaken in accordance with RISSB's accredited process. As part of the approval process, the Standing Committee verified that proper process was followed in developing the Standard

RISSB 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 comment 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.



Deb Spring
Exec. Chair / CEO
Rail Industry Safety and Standards Board

Keeping Standards up-to-date

Australian Standards developed by RISSB are living documents that reflect progress in science, technology and systems. To maintain their currency, Australian Standards developed by RISSB are periodically reviewed, and new editions published when required. Between editions, amendments may be issued. Australian Standards developed by RISSB could also be withdrawn.

It is important that readers assure themselves they are using a current Australian Standard developed by RISSB, which should include any amendments that have been issued since the Standard was published. Information about Australian Standards developed by RISSB, including amendments, can be found by visiting www.rissb.com.au.

RISSB welcomes suggestions for improvements and asks readers to notify us immediately of any apparent inaccuracies or ambiguities. Members are encouraged to use the change request feature of the RISSB website at: <http://www.rissb.com.au/products/>. Otherwise, please contact us via email at info@rissb.com.au or write to Rail Industry Safety and Standards Board, PO Box 518 Spring Hill Qld 4004, Australia.

Notice to users

This RISSB product has been developed using input from rail experts from across the rail industry and represents good practice for the industry. The reliance upon or manner of use of this RISSB product is the sole responsibility of the user who is to assess whether it meets their organisation's operational environment and risk profile.

AS 7511:2020

Onboard train protection systems

Document details

First published as: AS 7501:2020

ISBN 978-1-76072-851-9

Document history

Publication Version	Effective Date	Reason for and Extent of Change(s)
2020	June 01, 2020	First publication

Approval

Name	Date
Rail Industry Safety and Standards Board	1/06/2020

Copyright

© RISSB

All rights are reserved. No part of this work can be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of RISSB, unless otherwise permitted under the Copyright Act 1968.

Published by SAI Global Limited under licence from the Rail Industry Safety and Standards Board, PO Box 518 Spring Hill Qld 4004, Australia

This Standard was prepared by the Rail Industry Safety and Standards Board (RISSB) Development Group AS 7511 Onboard train protection systems. Membership of this Development Group consisted of representatives from the organisations listed on the inside cover of this document

Objective

The purpose of this document is to provide requirements, recommendations and guidance for onboard train protection systems and establishes industry standards for these systems. Onboard train protection systems are implemented to reduce the risk of accidents or incidents due to driver error or incapacity.

Compliance

There are two types of control contained within Australian Standards developed by RISSB:

1. Requirements.
2. Recommendations.

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 recognise 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.

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.

Controls in RISSB standards address known railway hazards are addressed in Appendix E.

This Standard 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, it does not form part of the requirements and recommendations of this Standard.

Contents

1	Scope and general	5
1.1	Scope	5
1.2	Normative references.....	5
1.3	Terms and definitions.....	6
1.4	Abbreviations.....	7
2	General	9
2.1	Application of this Standard	9
2.2	Interoperability principles	9
2.3	Document structure.....	10
3	Onboard train protection system (OTPS).....	11
3.1	Onboard train protection systems definition	11
3.2	OTPS interfaces	12
4	Selected OTPS.....	14
4.1	Selected OTPS definitions	14
4.2	Interface requirements	15
4.3	Operational requirements.....	15
4.4	Design requirements.....	16
4.5	RAMS requirements.....	18
4.6	Environmental requirements	20
5	Individual OTPS types	22
5.1	General.....	22
5.2	Vigilance system.....	23
5.3	Mechanical train stop and trip gear system (MTSTGS)	27
5.4	Automatic warning system (AWS).....	32
5.5	Train protection and warning system (TPWS).....	37
5.6	Station protection system (SPS)	42
5.7	Operator enable system (OES).....	46
5.8	Automatic train protection (ATP)	48

Appendix Contents

Appendix A	Guidance on the application of OTPS (informative).....	50
A.1	General.....	50
A.2	OTPS application guidance.....	51
Appendix B	Examples of OTPSs used (informative)	57
Appendix C	Interoperability component selection guidance (informative)	59
Appendix D	Guidance on vigilance timing cycle (informative).....	60
Appendix E	Hazard register (informative).....	61
Appendix F	Bibliography (informative)	62

1 Scope and general

1.1 Scope

The scope of this Standard is constrained to onboard train protection systems (OTPSs) as fitted to new, modified or existing self-propelled locomotive, passenger and infrastructure rolling stock.

The document covers the application, design, interface, construction and maintenance of onboard train protection systems.

The onboard train protection systems specifically covered in this document are:

- (a) vigilance system;
- (b) mechanical train stop and trip gear system (MTSTGS);
- (c) Automatic Warning System (AWS);
- (d) Train Protection and Warning System (TPWS);
- (e) Station Protection System (SPS);
- (f) operator enable system (OES);
- (g) automatic train protection system (ATP).

The Standard is not specifically intended to cover rolling stock used on light rail, cane railway and monorail networks, but items from this Standard may be applied to such systems as deemed appropriate by the relevant railway infrastructure manager (RIM).

Operation of rolling stock is not covered in this Standard.

The design and operation of wayside elements that interface with the onboard train protection systems is not covered in this Standard.

The design and operation of other rolling stock systems that interface with the onboard train protection systems is not covered in detail in this Standard.

Network operational rules are not covered in detail in this Standard.

The Standard is not specifically intended to cover onboard train protection systems on trains with a grade of automation 2 or above (GoA 2+) as defined in EN62290-1, but items from this Standard may be applied to such systems as deemed appropriate by the relevant RIM.

1.2 Normative references

The following referenced documents are indispensable for the application of this Standard:

- AS 7450 - Rail Systems Interoperability.
- AS 7470 Human Factors integration in engineering design – General requirements.
- AS 7722 – EMC management.
- AS 7527 - Rolling Stock Event Recorders.
- AS 7533 – Driving Cabs.
- AS 7666 - Train Protection and Control Interoperability.
- AS 7770- Rail Cyber Security.