AS 1085.20:2020

Australian STANDARD®

Railway track materials, Part 20: Welding of steel rail

RISSB
RAIL INDUSTRY SAFETY AND STANDARDS BOARD

Infrastructure Standard

This Australian Standard® AS 1085.20 Railway track materials, Part 20: Welding of steel rail was prepared by a Rail Industry Safety and Standards Board (RISSB) Development Group consisting of representatives from the following organisations:

ARTC	Aurizon Network	BHP Billiton
Goldschmidt	John Holland Group	LMATS
Monash Institute of Railway Technology	Pandrol	Queensland Rail
Rail Technology International	Rio Tinto	

The Standard was approved by the Development Group and the Infrastructure Standing Committee in June, 2020. On June 23, 2020 the RISSB Board approved the Standard for release.

This Standard was issued for public consultation.

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

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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.

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Approval

Name	Date
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This Standard was prepared by the Rail Industry Safety and Standards Board (RISSB) Development Group AS 1085.20 Railway track materials, Part 20: Welding of steel rail. Membership of this Development Group consisted of representatives from the organisations listed on the inside cover of this document

This Standard supersedes previous versions of AS 1085.20 in whole.

Objective

The objective of this Standard is to provide owners and maintainers of railway track with specifications for and means of qualification of welding procedures for use with rail steel in railway track.

This Standard does not address the conditions under which the procedures that are described are to be used.

This Standard is not intended to cover welding of worn steel rails using flash butt or aluminothermic welds. However, the principles and procedures may be adapted for the joining of worn rails.

It is not intended to cover existing welds.

This Standard is Part 20 of the AS 1085 (Railway track material) series.

Changes in the 2020 version include:

a) revised production tests.
b) annual requalification tests.
c) the introduction of additional magnetic particle inspections and phased array ultrasonic tests.
d) clarifications on the microstructural requirements for flash butt welds.

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 an Appendix A.

Any existing aluminothermic welding or arc welding procedures evidenced to meet the testing requirements of AS 1085.15:1995, AS 1085.20: 2006 or AS 1085.20: 2012 will not need to be requalified unless requalification triggers specified in this Standard have occurred.

Contents

Appendix Contents

1 Scope and general

1.1 Scope

This Standard specifies requirements for the qualification of welds in steel rail manufactured in accordance with AS 1085.1 or rails that are shown to be metallurgically compatible for use in railway track. The following welding processes are covered:

(a) Joining of rails by flash butt welding or aluminothermic fusion welding.

(b) Repair of the railhead by arc welding or aluminothermic fusion welding.

The Standard does not provide strength properties of welds for use in design, apply to the aluminothermic or flash butt welding of tri-metal steel assemblies, or cover the welding of austenitic manganese steels.

NOTES:

1. This Standard is only intended for steel rails used in railway tracks and does not apply to any other applications.
2. Rail produced to specifications other than AS 1085.1 will require a separate qualification process. Appropriate testing and acceptance requirements will also need to be determined.
3. Other welding processes may be used if the welds produced meet all requirements identified in this Standard and are accepted by the rail infrastructure manager.
4. Additional guidance on this Standard is given in Appendix B.

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 1003 Engineers' straightedges (metric units)
- AS 1085.1 Railway track materials, Part 1: Steel rails
- AS 1816.1 Metallic materials—Brinell hardness test, Part 1: Test method (ISO 6506-1:2005, MOD)
- AS 1817.1 Metallic materials—Vickers hardness test, Part 1: Test methods (ISO 6507-1:1997, MOD)
- AS 2083 Calibration blocks and their methods of use in ultrasonic testing
- AS 2193 Calibration and classification of force-measuring systems
- AS 2205.5.1 Methods for destructive testing of welds in metal, Method 5.1: Macro metallographic tests for cross-section examination
- AS 2205.6.1 Methods for destructive testing of welds in metal, Method 6.1: Weld joint hardness test
- AS 2207 Non-destructive testing—Ultrasonic testing of fusion welded joints in carbon and low alloy steel
- ISO 9712 Non-destructive testing—Qualification and certification of NDT personnel

NOTE: Documents for informative purposes are listed in a Bibliography at the back of the Standard as Appendix R.