

Australian Standard™

Railway track material

Part 3: Sleeper plates



This Australian Standard was prepared by Committee CE-002, Railway Track Materials. It was approved on behalf of the Council of Standards Australia on 14 June 2002 and published on 1 August 2002.

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Australian Chamber of Commerce and Industry
Australian Industry Group
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STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1085.3—2002

Railway Track Material

Part 3: Sleeper Plates

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Technical Committee CE-002 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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NOTES

Australian Standard™

Railway track material

Part 3: Sleeper plates

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PREFACE

This Standard was prepared by the Standards Australia Committee CE-002, Railway Track Materials, to supersede AS 1085.3—2000, *Railway permanent way material*, Part 3: *Sleeper plates*.

The objective of this Standard is to provide manufacturers and purchasers with materials, dimensions and performance requirements for rolled or cast sleeper plates of clip-fastening and double shoulder type intended for use with timber sleepers in railway track.

Changes to the previous edition are as follows:

- (a) Change of title of the AS 1085 series (previously *Railway permanent way material*).
- (b) The referenced documents list has been revised.
- (c) The most recent version of the informative Appendix 'Means of demonstrating compliance with this Standard' has been included.

This Standard covers cast iron sleeper plates and alloyed carbon steel sleeper plates within the limits for chemical composition. In the area of unalloyed carbon steel baseplates it is based on ISO 6305-2—1983, *Railway components—Technical delivery requirements*, Part 2: *Unalloyed carbon steel baseplates*, but differs from it as follows:

- (i) This Standard contains no requirements covering working gauges, acceptance conditions or statistical quality level criteria for product.
- (ii) Materials for rolling are specified by chemical analysis.
- (iii) Tolerances are specified for more dimensions and are in some cases different.
- (iv) A bend test has been included.
- (v) Marking includes more detail.

An Appendix includes full development profiles and section properties for sleeper plates.

The Standard now requires that the datum side of rolled steel sleeper plates be clearly marked and the chemical composition has been brought in line with other recently published steel Standards.

This Standard does not preclude the adoption, by agreement between the purchaser and the manufacturer, of requirements other than those specified herein. The drawings in the Appendices show typical hole positions only; alternative arrangements may be negotiated with respect to hole configurations, dimensions and tolerances.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard
Railway track material

Part 3: Sleeper plates

1 SCOPE

This Standard specifies requirements for double-shoulder and clip-fastening sleeper plates manufactured from rolled steel or from spheroidal graphite cast iron (cast sleeper plates) for use in conjunction with steel rails rolled in accordance with AS 1085.1.

NOTES:

- 1 The sleeper plates may also be used for rail sizes not currently covered in AS 1085.1.
- 2 See Appendix A for a list of the information that should be supplied by the purchaser when enquiring about or ordering sleeper plates to this Standard.
- 3 See Appendix B for means of demonstrating compliance with this Standard.

2 PURPOSE AND CONTEXT OF USE**2.1 Function**

Sleeper plates are intended to act as part of a restraining assembly to hold steel rails to timber sleepers in railway track. Sleeper plates usually have two vertical surfaces (shoulders) that bear against the edges of the rail foot, holes to allow for securing the plate to the sleeper using spikes, screws or bolts and means for securing the rail in place on the plate using a clip or dog spike.

2.2 Action

Sleeper plates transfer loads from the rail to the sleeper both laterally and horizontally. Loads arise from thermal effects, passage of rolling stock at speed and maintenance. The shoulders ensure that the rail remains square to the sleeper in the horizontal plane.

3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1085	Railway track material
1085.1	Part 1: Steel rails
1100	Technical drawing
1100.101	Part 101: General principles
1199	Sampling procedures and tables for inspection by attributes
1399	Guide to AS 1199—Sampling procedures and tables for inspection by attributes
1442	Carbon steels and carbon-manganese steels—Hot-rolled bars and semi-finished products
1831	Ductile cast iron
2706	Numerical values—Rounding and interpretation of limiting values
3978	Non-destructive testing—Visual inspection of metal products and components

AS/NZS

ISO 9001 Quality management systems—Requirements

ISO 9004 Quality management systems—Guidelines for performance improvements

SAI

HB18 Guidelines for third-party certification and accreditation

HB18.28 Guide 28—General rules for a model third-party certification scheme for products

4 DEFINITIONS

4.1 Sleeper plate

A metal plate placed between a rail and a sleeper which serves to control the position of the rail and distribute a load from the rail to the sleeper. The plate is normally used with timber sleepers and fastened to the sleepers with spikes, screws or bolts.

4.2 Clip-fastening sleeper plate

A sleeper plate that provides for resilient clips to secure the rail to the sleeper plate.

NOTE: Some rail fastening systems allow use of a sleeper plate, as defined in Clause 4.1, as a clip-fastenings plate.

4.3 Clip housing

An integral part of a clip-fastening sleeper plate, one on each side of the rail seat (or more for some types), shaped to provide for the application of a resilient clip.

4.4 Double-shoulder sleeper plate

A sleeper plate that has a raised section formed on each side of the rail seat, to locate the rail.

4.5 Plate fastening holes

Holes in the sleeper plate through which spikes, screws or bolts are applied to fasten the plate to the sleeper or rail support structure.

4.6 Rail fastening holes

Holes on each side of the rail seat of the double-shoulder plate through which rail fastening systems (e.g. spikes) are applied.

4.7 Rail seat

The area of the plate on which the foot of the rail will be positioned.

4.8 Rail seat cant

The slope of the rail seat (e.g. 1 in 20) which provides for the inclining of the rails towards the centre-line of the track.

5 ROUNDING OF NUMBERS

For the purposes of assessing compliance with this Standard, the specified limiting values herein shall be interpreted in accordance with the 'rounding method' described in AS 2706, that is, the observed or calculated value shall be rounded to the same number of figures as in the specified or calculated value and then compared with the specified limiting values. For example, for specified limiting values of 2.5, 2.50 and 2.500, the observed or calculated value would be rounded respectively to the nearest 0.1, 0.01 and 0.001.

6 DESIGNATION

The sleeper plates shall be designated by the fastening system, i.e.

- (a) clip-fastening or double shoulder;
- (b) the type of rail seating (whether taper or level base);
- (c) the type of punched or formed hole;
- (d) the manufacturing method (cast or rolled);
- (e) the number of this Australian Standard; and
- (f) the nominal width of rail foot.

Example:

Clip-fastening 1 in 20 taper base D hole cast sleeper plate to AS 1085.3, for 146 mm rail base.

NOTE: Further information is given in Appendix A.

7 DIMENSIONS AND TOLERANCES

Dimensions and shapes shall conform to the appropriate Figure in Appendices C and D, subject to the tolerances specified in Table 1.

Where the rail size or other detail is not covered in this Standard, other plate dimensions may be used, provided that, to the satisfaction of the purchaser, equal or better performance has been established by design calculations and test results or the performance has been established by field testing or a case history of successful use.

NOTES:

- 1 This requirement does not preclude the negotiation between the purchaser and the manufacturer of dimensions and tolerances of holes and hole centres other than those specified herein and any special or supplementary requirements.
- 2 Sleeper plates are typically fastened to timber sleepers with spring spikes, dogspikes, screws or bolts as is the case with the examples provided in Appendices C and D; however, sleeper plates may be designed for use with alternative plate fastenings, such as screw spikes or bolts. Accordingly, the number of fastening holes and hole centre positions may also be varied from those set out in the examples provided.
- 3 Cant reducing plates may be required where the cant is set at values between the flat and maximum canted plates. Typical series for intermediate cants are as follows:
 - (a) For 1:20 canted curves..... 1:30, 1:40, 1:80.
 - (b) For 1:20 canted curves..... 1:26.7, 1:40, 1:80.
 - (c) For 1:30 canted curves..... 1:40, 1:80.

TABLE 1
DIMENSIONAL TOLERANCES

Description	Tolerance mm
Rail seat width	+1.0 – 0.5
Rail seat flatness (Notes 1 and 2) No convexity allowed	1.0 max. rolled plates 0.8 max. cast plates
Rail seat thickness (at lowest end of cant)	+1.0 – 1.5
Rail seat cant	±1 in 400
Width	±3
Length	±3
Underside concavity	0.0 mm
Underside convexity	1.5 mm max.
Size of holes (at bottom surface)	±0.6
Position of holes	±1.0
Taper of square holes (diminishing top to bottom)	0.8 max.
End squareness	6.0 max.
Local areas of deformation (caused by shearing and punching)	0.5 max.
Unspecified tolerances	±1
Unspecified radii	3 min.
Dimensions common to clip-fastening plates only:	
Datum 'H' to heel seat	±0.5
Datum 'H' to rail seat	±0.5
Rail seat boundary to clip housing centre-line	±0.5

NOTES:

- 1 Tolerance applies as maximum value, except for local areas of deformation caused by shearing.
- 2 For interpretation, see AS 1100.101.

8 MATERIALS

8.1 Rolled steel

The steel used for the manufacture of rolled steel sleeper plates shall comply with the requirements of AS 1442 and shall be selected from the appropriate grades in Table 3 or Table 4 of AS 1442 and shall comply with the chemical composition limits (cast analysis) as set out in Table 2 of this Standard.

TABLE 2
CHEMICAL COMPOSITION (CAST ANALYSIS)

					Percent
Analysis					
Carbon	Silicon	Manganese	Phosphorus	Sulfur	Nitrogen
0.30 max.	0.35 max.	0.80 max.	0.040 max.	0.050 max.	0.008 max.

8.2 Cast iron

The material used for the manufacture of cast spheroidal graphite iron sleeper plates shall comply with the requirements of AS 1831 for Grade 500/7.

NOTE: Grade 400/12 may be preferred for some applications and the appropriate grade should be specified by the purchaser.

9 HOLES

Holes adjacent to the edge of the foot of the rail may be square or D shape and the arrangement of holes may also vary (see Appendix A). The arrangement of holes shall be such that the edge of any hole is no less than 10 mm from an edge.

NOTE: When specifying arrangements of holes, it should be remembered that spikes driven into the timber sleeper along the same grain line may encourage splitting to occur in the sleeper.

D holes shall be dimensioned as shown in Figure 1.

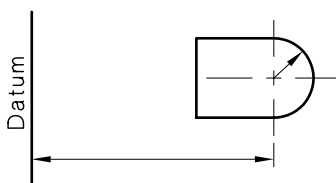


FIGURE 1 DIMENSIONING OF D HOLES

10 FINISH

10.1 Rolled steel sleeper plates

The sleeper plates shall be free from injurious warp, harmful burrs and other defects detrimental to their subsequent use; however, localized areas of deformation caused by shearing and punching shall be permitted (see Clause 7).

10.2 Cast sleeper plates

Cast sleeper plate shall be free of burned-on sand, cavities, blowholes, cracks or other visible surface defects. All joint line fins shall be removed. Provided that the sleeper plate function is not impaired, it may not be necessary to flush fettling in-gates or risers, or both.

11 TESTING

11.1 Bend test for rolled sleeper plates

When tested in accordance with Appendix E, rolled steel sleeper plates shall withstand the test without cracking. Superficial surface defects which become apparent on the outside surface of the specimen as a result of bending shall not be considered a cause for failure.

11.2 Mechanical tests for cast sleeper plates

If required, mechanical properties of the castings shall be determined in accordance with AS 1831.

11.3 Visual inspections of cast sleeper plates

Castings shall be visually inspected in accordance with AS 3978.

12 MARKING

The sleeper plates shall be distinctly branded with raised characters including the following information:

- (a) The nominal width of foot of the rails with which the sleeper plates are intended to be used.
- (b) The cant.
- (c) A mark to signify the manufacturer and the last 2 figures of the year of manufacture.
- (d) A part or plate identification number which identifies the number, nature and position of holes. The manufacturer shall supply to the purchaser the meaning of any code used for this purpose.

Letters and figures shall be positioned on the top, outside the shoulder with the width of foot on the datum side of the sleeper plates, and shall be raised not less than 0.5 mm from the surface (see Figures in Appendices C and D). Each finished sleeper plate shall contain the full information.

NOTE: Manufacturers making a statement of compliance with this Australian Standard on product packaging or promotional material related to that product are advised to ensure that such compliance is capable of being verified.