AS 5100.4—2004
AP-G15.4/04
(Incorporating Amendment Nos 1 and 2)



Australian Standard®

# Bridge design

# Part 4: Bearings and deck joints



This Australian Standard® was prepared by Committee BD-090, Bridge Design. It was approved on behalf of the Council of Standards Australia on 29 July 2003.
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The following are represented on Committee BD-090:

- Association of Consulting Engineers Australia
- Australasian Railway Association
- Austroads
- Bureau of Steel Manufacturers of Australia
- Cement and Concrete Association of Australia
- Institution of Engineers Australia
- Queensland University of Technology
- Steel Reinforcement Institute of Australia
- University of Western Sydney

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This Standard was issued in draft form for comment as DR 00377.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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# Part 4: Bearings and deck joints

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# PREFACE

This Standard was prepared by the Standards Australia Committee BD-090, Bridge Design to supersede HB 77.4—1996, *Australian Bridge Design Code*, Section 4: *Bearings and deck joints*, and AS 1523, *Elastomeric bearings for use in structures*.

*This Standard incorporates Amendment No. 1 (April 2010) and Amendment No. 2 (December 2010). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.*

The AS 5100 series represents a revision of the 1996 HB 77 series, *Australian Bridge Design Code*, which contained a separate Railway Supplement to Sections 1 to 5, together with Section 6, *Steel and composite construction*, and Section 7, *Rating*. AS 5100 takes the requirements of the Railway Supplement and incorporates them into Parts 1 to 5 of the present series, to form integrated documents covering requirements for both road and rail bridges. In addition, technical material has been updated.

This Standard is also designated as AUSTROADS publication AP-G15.4/04.

The objectives of AS 5100 are to provide nationally acceptable requirements for—

(a) the design of road, rail, pedestrian and bicycle-path bridges;

(b) the specific application of concrete, steel and composite steel/concrete construction, which embody principles that may be applied to other materials in association with relevant Standards; and

(c) the assessment of the load capacity of existing bridges.

These requirements are based on the principles of structural mechanics and knowledge of material properties, for both the conceptual and detailed design, to achieve acceptable probabilities that the bridge or associated structure being designed will not become unfit for use during its design life.

Whereas earlier editions of the *Australian Bridge Design Code* were essentially administered by the infrastructure owners and applied to their own inventory, an increasing number of bridges are being built under the design-construct-operate principle and being handed over to the relevant statutory authority after several years of operation. This Standard includes clauses intended to facilitate the specification to the designer of the functional requirements of the owner, to ensure the long-term performance and serviceability of the bridge and associated structure.

Significant differences between this Standard and HB 77.4 are the following:

(i) *Pot bearings and sliding surfaces* Design criteria for pot bearings and sliding contact surfaces have been specified at the ultimate limit states.

(ii) *Mechanical bearings* Design provisions for mechanical bearings previously in HB 77.6 have been moved to this Standard.

(iii) *Multiple pot bearing* Additional clauses have been included relating to the reaction of multiple pot bearings to sliding forces.

(iv) *Anchorages* The rules for anchorage of pot bearings, laminated elastomeric bearings and deck joints have been revised.

(v) *Testing* Testing of elastomer and laminated elastomeric bearings has been added.

In line with Standards Australia policy, the words ‘shall’ and ‘may’ are used consistently throughout this Standard to indicate, respectively, a mandatory provision and an acceptable or permissible alternative.

Statements expressed in mandatory terms in Notes to Tables are deemed to be requirements of this Standard.

The term ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of the Standard. An ‘informative’ appendix is only for information and guidance.

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## 1 SCOPE

This Standard sets out minimum design and performance requirements for bearings and deck joints for the articulation and accommodation of movements of bridge structures.

This Standard applies to elastomeric, pot and mechanical bearings and deck joints, all of which are locations where rotation or translation, or both, can take place. It does not apply to concrete hinges or PTFE-lined spherical bearings.

## 2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

| | |
|---|---|
| AS | |
| 1683 | Methods of test for elastomers |
| 1683.11 | Method 11: Tension testing of vulcanized or thermoplastic rubber |
| 1683.12 | Method 12: Rubber, vulcanized or thermoplastic—Determination of tear strength (trouser, angle and crescent test pieces) |
| 1683.14.1 | Method 14.1: Adhesive strength of vulcanized or thermoplastic rubber—One-plate method |
| 1683.15.1 | Method 15.1: International rubber hardness |
| 1683.15.2 | Method 15.2: Durometer hardness |
| 1683.22 | Method 22: Determination of vulcanization characteristics using the oscillating disc curemeter |
| 1683.24 | Method 24: Determination of the resistance of vulcanized or thermoplastic rubbers to ozone cracking—Static strain test |
| 1683.26 | Method 26: Rubber, vulcanized or thermoplastic—Accelerated ageing or heat-resistance tests |
| 5100 | Bridge design |
| 5100.2 | Part 2: Design loads |
| 5100.5 | Part 5: Concrete |
| 5100.6 | Part 6: Steel and composite construction |
| 5100.4 Supp 1 | Bridge design—Bearings and deck joints—Commentary (Supplement to AS 5100.4—2003) |
| ISO | |
| 815 | Rubber, vulcanized or thermoplastic—Determination of compression set at ambient, elevated or low temperatures |
| 13000 | Plastics—Polytetrafluoroethylene (PTFE) semi-finished products |
| 13000-1 | Part 1: Requirements and designation |
| 1827 | Rubber, vulcanized or thermoplastic—Determination of modulus in shear or adhesion to rigid plates—Quadruple shear method |
| 4661 | Rubber, vulcanized or thermoplastic—Preparation of samples and test pieces |
| 4661.1 | Part 1: Physical tests |