Australian Standard™

Railway permanent way material

Part 17: Steel sleepers

Standards Australia

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The following interests are represented on Committee CE/2:

Australasian Railway Association

Australian Chamber of Commerce and Industry

Australian Industry Group

Bureau of Steel Manufacturers of Australia

Rail Track Association Australia

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PREFACE

This Standard was prepared by the Standards Australia Committee CE/2, Railway Permanent Way Materials.

The objective of this Standard is to provide purchasers and suppliers including owners, operators, designers and manufacturers of railway sleepers with requirements for the specification, manufacture and testing of trough-shaped steel sleepers for use in railway track.

This Standard is intended for use by persons experienced in track design and performance and who have a good knowledge of the duty and environment of the track in which the sleepers are to be used (see also Foreword).

Loads and calculation methods given in this Standard are in permissible stress format and are not based on limit states principles.

Statements expressed in mandatory terms in notes to tables are deemed to be requirements of this Standard.

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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FOREWORD

The performance of steel sleepers in track depends on the condition of the rail, the condition and type of rail joints, the ballast support and the rail fastening system. Accordingly, when considering their performance, the sleeper and its fastening together with the rail must be regarded as interdependent components of a system.

The limits given in this Standard are based on the current state of knowledge of steel sleeper behaviour in service; however, service conditions are difficult to define and test criteria, which are seen as the most appropriate for the current state of knowledge, have been adopted.

A critical design aspect of steel sleepers is the interaction of the fastening and the portion of sleeper around the hole in which the fastening is secured. The rail seat assembly repeated load test can not be used to predict the expected in-track fatigue life. It does, however, provide a means of acceptance of a design by comparison with existing proven designs on the basis of experience.

The loads used in testing and design should reflect the use of the sleeper. For example, if sleepers are used in an interspersed pattern, a disproportionate amount of the load may be taken by a particular sleeper and early in-service failure may result.

This Standard does not cover sleepers for use in curves with a radius less than 200 m.

Track constructed using sleepers and fastener components meeting the requirements of this Standard is expected to give satisfactory performance when properly installed and under an appropriate maintenance program.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies the performance requirements and gives design and testing methods for trough-shaped steel sleepers and their associated components for use in railway track. It also sets out requirements for the performance of rail-insulating components.

NOTES:

1 Sleepers are generally designed to suit a specific rail profile and gauge with a given fastening.

2 Guidance to purchasers on information needing to be supplied at the time of calling for tenders or quotations and testing of new products is given in Appendix A.

3 Information on the means for determining compliance with this Standard is given in Appendix B.

4 Guidelines on the design and manufacture of special sleepers and fastenings are given in Appendix C.

1.2 PURPOSE AND CONTEXT OF USE

1.2.1 Function

Sleepers are support members that are part of the structure of railway permanent way. They are embedded into the ballast and support the rails above. They tie the rails together maintaining gauge and rail position and resisting lateral and longitudinal movement of the rail system. Fastenings, as part of the sleeper assembly, secure the rails to the sleeper.

1.2.2 Action

Sleepers are subject to—

(a) loads imposed by the passage of rolling stock on the rails and during maintenance;

(b) loads generated by thermal effects on the rail and by ballast movement; and

(c) fatigue, wear, damage and corrosion.

1.3 TESTING

Testing shall be conducted by a laboratory appropriately qualified to carry out the tests. Testing shall be carried out on sleeper assemblies or elements that have been produced using the processes and the plant, and with the materials that the manufacturer uses or intends to use in mass production. The tests given in this Standard are for the design and acceptance of steel sleepers.

Testing shall be carried out using the rail profile (or part of the rail profile, as appropriate) and the sleeper assembly, including rail fastening, that is intended to be used. This includes the use of spacers or other variation in configuration (e.g. multiple sets of holes).