AS 2903—1986

Australian Standard®

HELICAL SPRINGS FOR RAILWAY ROLLING STOCK

This Australian standard was prepared by Committee ME/12, Railway Rolling Stock. It was approved on behalf of the Council of the Standards Association of Australia on 1 August 1986 and published on 6 October 1986.

The following interests are represented on Committee ME/12:

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

Institution of Engineers Australia

Metal Trades Industry Association of Australia

Railways of Australia Committee

Representatives of spring manufacturers also participated in the drafting of this standard.

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PREFACE

This standard was prepared by the Association's Committee on Railway Rolling Stock. It replaces AS E4—1938, Volute and Helical Springs, and AS E5—1938, Carbon Spring Steel for Volute and Helical Springs, which were withdrawn in May 1979.

Investigation has confirmed that carbon steel is no longer in general use for the manufacture of helical springs of this type, and that the use of volute springs does not warrant inclusion in an Australian standard.

In preparing this standard, the committee gave close attention to BS 24, Railway Rolling Stock Material, Part 3B—1955, Helical and Volute Springs and Spring Steels, issued by the British Standards Institution, and to Specification M-114-65, Helical Springs, Heat Treated Steel, issued by the Association of American Railroads. The standard combines features from each of these specifications as applied in the manufacture of helical springs in Australia.

Reference is made to AS 1447, Hot-rolled Spring Steels, for the selection of bar material and to SAE J404 OCT80, Chemical Compositors of SAE Alloy Steels to cover the inclusion of grade SAE J404/6150.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
HELICAL SPRINGS FOR RAILWAY ROLLING STOCK

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for materials and manufacturing requirements for helical springs used for railway rolling stock.

1.2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1447	Hot-rolled Spring Steels
AS 1816	Method for Brinell Hardness Test Part 1—Testing of Metals
AS 2003	Methods for the Measurement of Decarburization in Carbon and Low Alloy Steels
AS 2536	Surface Texture
SAE J404 OCT80	Chemical Compositions of SAE Alloy Steels
SAE J442 AUG79	Tests Strip, Holder and Gage for Shot Peening
SAE J443 JAN84	Procedures for Using Standard Shot Peening Test Strip

1.3 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.3.1 Coils.

1.3.1.1 *Inside diameter*—the diameter of the inside helix surface when the spring is in the free length mode.

1.3.1.2 *Mean diameter*—the sum of the inside diameter and the outside diameter divided by two.

1.3.1.3 *Number of coils*—total number of coils from tip to tip.

1.3.1.4 *Number of working coils*—the total number of coils excluding any coils used for end bearing or fixing purposes.

1.3.1.5 *Outside diameter*—the diameter of the outside helix surface when the spring is in the free length mode.

1.3.1.6 *Pitch*—the distance from the centre of section of one coil to the centre of section of the next coil measured parallel to the axis of the spring.

1.3.2 Deflection—the total axial displacement of the ends of the spring upon the application of an axial force.

1.3.3 Length.

1.3.3.1 *Free length*—the overall axial length when no external force is applied.

1.3.3.2 *Solid length*—the overall axial length when the spring is compressed until the coils are generally in metal-to-metal contact.

NOTE: This length is considered to be achieved when an increase of the axial compressive force by up to 50 percent produces no significant further spring deflection.

1.3.4 Length characteristic—the measure of the length of the spring when a predetermined compressive force is applied.

1.3.5 Load characteristic—a measure of the compressive force resulting in a predetermined length of the spring.

1.3.6 Load-length characteristic—the relationship between the spring length and the applied force.

1.3.7 Helical spring—a spring coiled in a parallel helix designed to reduce in overall axial length upon the application of an axial compressive force.

1.3.8 Rate—the change of load per unit length of spring deflection.

1.3.9 Shall and should—shall is taken as mandatory, should is advisory.