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# **RAIL**INFRASTRUCTURE CORPORATION

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**Rolling Stock Engineering Standard**

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**Material Specification**

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**SPECIFICATION FOR COIL SPRINGS**

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## **About This Standard**

This specification is based on the TRS 0130

## **Version History**

**Version 1.0**

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## 1 Scope

This Specification provides for the manufacture and supply of laminated, helical and volute springs.

Springs shall be manufactured in accordance with the requirements of the drawings together with the Australian or British Standards except where amended below.

Qualify used coil springs to RSS 0043.

Suppliers shall have their manufacturing facility available for engineering audits when requested by RIC.

## 2 Laminated Springs

### 2.1 Steel For Laminated Springs

The steel shall comply to the requirements of AS 1447/XK9258S or suitable alternative.

### 2.2 Buckles

Steel for buckles shall comply with AS 3678-250 and be of one piece construction with no welded seams.

Buckles of special design, subject to agreement between the purchaser and the manufacturer, may be made of steel castings conforming to AS 2074, Grade C4-1.

When specified, finished buckles to the number of one (1) in every hundred or part thereof shall be selected by the purchaser (or his representative), for testing to destruction.

### 2.3 Assembled Springs

Laminated springs shall be manufactured so as to comply with the requirements of BS24: Part 3A: 1959 Section Three so amended to allow for compliance to the requirements of Section 2.1 and 2.2 of this Specification.

## 3 Helical and Volute Springs

### 3.1 Steels for Helical and Volute Springs

The steel shall comply to the requirements of AS 1447, as follows:-

- for silico - manganese spring steel: AS 1447/XK9261S or AS 1447/X4K92M61S
- for Ni-Cr-Mo spring steel: AS 1447/XK8660S

Note: XK8660S must be used for springs having a wire diameter greater than 39mm. XK5160S may be used as an alternative material for springs with a wire diameter less than or equal to 39mm.

### 3.2 Manufacture of Helical and Volute Springs

Spring for freight bogies shall be made from either hot rolled steel bar or from ground steel bar except, in cases where the drawings call for ground steel bar only to be used. However, all passenger and locomotive springs shall be manufactured from centreless ground bar.

Where a particular spring drawing states colour coding for free height identification purposes, then the complete outside surfaces of both end coils or a strip down the outside of each spring shall be painted the appropriate colour.

Coil pitch shall be uniform throughout the full length of the active coil section.

Springs shall have forged tapered ends.

Each end of the spring shall be ground to ensure that the seating is perpendicular to the axis of the spring with at least 75% spring contact with the base.

### 3.3 Springs made from Hot Rolled Steel Bars

The springs shall be manufactured so as to comply with AS 2903 except as follows:-

- The grade of steel bar shall comply with Section 3 of this Specification.
- Identification by branding shall be mandatory; such branding shall be legibly hot stamped on the outer circumference of at least one tapered end and the inner circumference of the other tapered end and shall consist of the drawing number, manufacturer's identification, the material and the year of manufacture.
- All stamping shall be sufficiently deep so as to be legible even after final painting of the spring.



- Springs made from Round Section, Ground Steel Bars

Helical springs shall be manufactured so as to comply with AS 2903, except as follows:-

- The grade of steel bar shall comply with Section 3 of this Specification.
- The shot peening of springs made from ground steel bars shall be mandatory; the springs shall be shot peened to a minimum intensity of 0.40mm and to a 90% visual coverage as measured on an Almen "A" strip. A test strip is to be located on the inside of a suitable test spring.

For each batch or order of springs, at least 2% of the total number of springs manufactured shall have spring certificates showing the following:-

- Free height dimension with tolerances as per AS 2903.
- Solid height dimension, where possible (ie: maximum shear stress levels permitting), with tolerances as per AS 2903.
- Load/deflection characteristics in graphical form showing travel from free to 80% of the solid height, with a permissible tolerance range not exceeding +/- 5%.
- These test certificates shall be supplied with the springs.

## 4 Reworking of Coil Springs

Only springs made from steels complying to this Specification shall be reworked. Plain carbon steel springs (commonly known as "oil hardening" and "water hardening" spring steels) shall not be reworked.

The reworking of helical coil springs shall comply with, "Qualification of Helical Coil Springs For Re-use in Locomotives and Rolling Stock Bogies."

After reworking, springs shall comply to all the requirements of this Specification.

## **5 Referenced Documents**

### **5.1 RIC Standards**

RSS 0043	Coil Spring Groups
RSS 0039	Handling, Storage and Transportation of Axles
RSS 0098	Specification for Suspension Bearing Surface Finish

### **5.2 Australian Standards**

AS 1447	Hot Rolled Spring Steel
AS 3678	Structural Steel – Hot Rolled Plates, Floorplates and Slabs
AS 2074	Cast Steels
As 2903	Helical Springs for Railway Rolling Stock

### **5.3 British Standards**

BS 24 Part 3A
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