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# **RAIL**INFRASTRUCTURE CORPORATION

Discipline  
**Rolling Stock Engineering Standard**

Category  
**Material Specification**

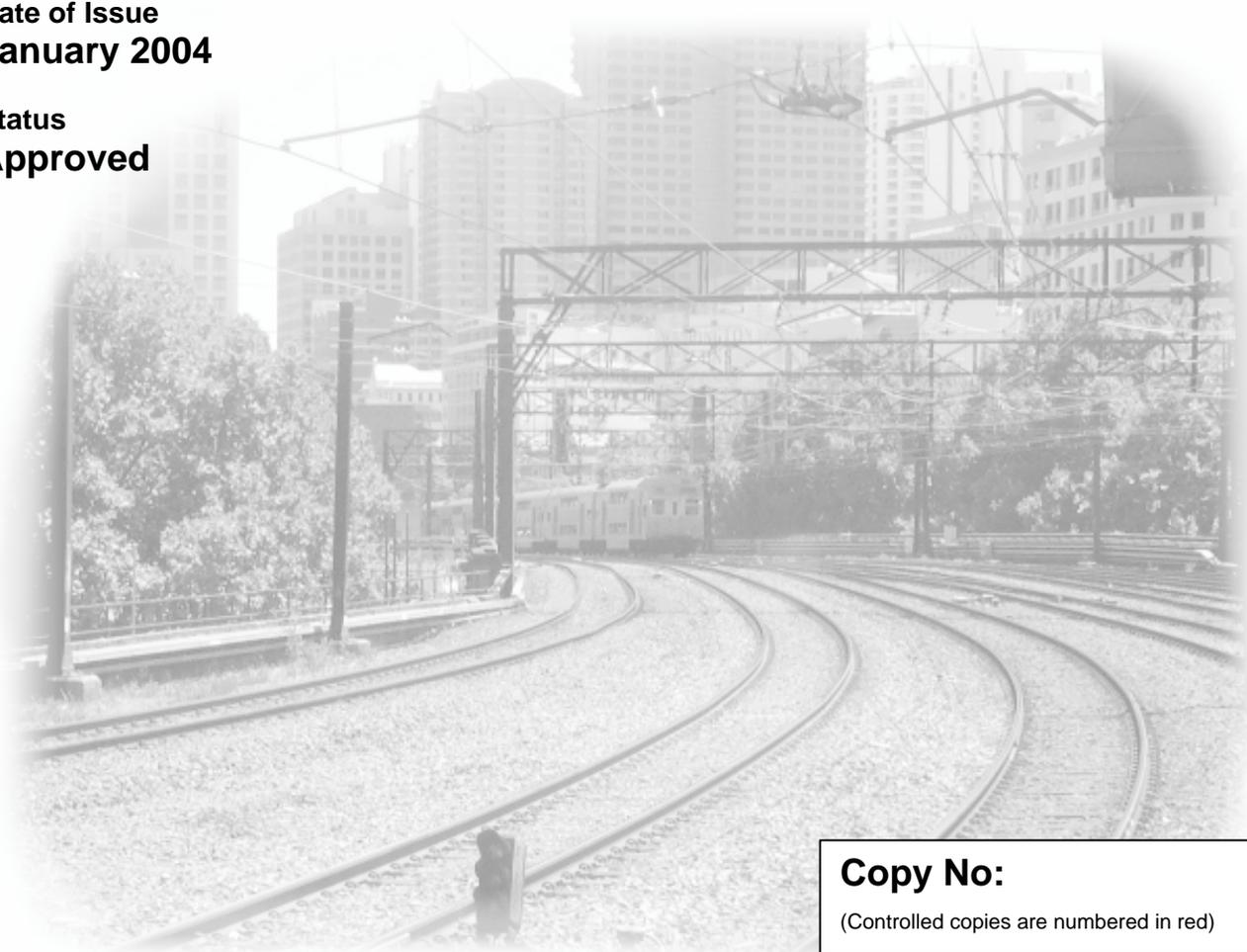
Title  
**SPECIFICATION FOR AXLE SUSPENSION BEARING  
SURFACE FINISH**

Reference Number  
**RSS 0098**

Version  
**1.0**

Date of Issue  
**January 2004**

Status  
**Approved**



**Copy No:**

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## **About This Standard**

This specification is based on the TRS 0150

## **Version History**

**Version 1.0**

**January 2004**

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## 1 Scope

This Specification covers the surface finish required on all traction motor suspension bearing axle journals. The surface finish requirement has been shown to be critical to the elimination of suspension bearing failures.

The requirements of this standard are difficult to achieve and a great deal of skill and experience are required to achieve the requirements on a consistent basis.

## 2 Surface Measurements

Every suspension bearing journal machined must be measured and meet the requirements of this standard. A hard copy of the charts must be kept with the quality documentation for each axle.

Measurements shall be taken in accordance with AS 2356.

Measuring equipment.

Any brand of surface measurement instrument may be used provided it is capable of the following:

- Producing a chart or hard copy output, as well as a surface roughness measurement in  $\mu\text{m Ra}$  units.
- Measuring a sample of at least 25 mm in length.
- Measuring at an axle length/chart length ratio of 0.2-0.25/1 (i.e 4 to 5x) for waviness and 0.01/1 (i.e 100x) for microroughness.
- Vertical scaling to be 4000x actual height of axle surface deviations.

## 3 Evaluation Of Chart

### 3.1 Waves

Measuring equipment setting to be set as per section 2. Measurements shall be taken and evaluated.

The size of waves found on the final journal surface shall not exceed a "Wave Index" factor of 0.1.

Where Wave Index =  $\frac{\text{Peak to valley } (\mu\text{m})}{\text{Wavelength from peak to peak (mm)}}$  taken from the chart.

Where the wave is constant or variable the wave index can be calculated as the average of the waves on one trace.

If more than one predominant wave is present the wave index criteria shall be applied to each wave.

## 3.2 Micro-Roughness

Measuring equipment setting to be set as per section 2. Measurements shall be taken and evaluated.

No sharp upward points exist in the surface, only rounded asperities are allowable.

The presence of deep valleys ( $>5\mu\text{m}$ ) should not exceed a frequency of 4 valleys in any 0.6mm of axle length.

## 3.3 Roughness

The finish on the final journal surface shall be between 0.076 and 0.254  $\mu\text{m Ra}$ .

# 4 Production Methods

## 4.1 Mandatory

Grind or turn the axle journal.

Roll the axle journal to the final finish explained above.

Rolling must always be the last operation on the journal surface. If necessary to use sandpaper or other abrasive material to clean an axle, a rolling operation must be the final operation.

## 4.2 Grinding Recommended practice

The following procedure has proved to give the required finish and thus can be used as a guideline for grinding:

- Use well lubricated dead centres.
- Axle rotation of 38 RPM.
- Wheel speed of 600-650 RPM.
- Traverse at 813 mm/minute.
- The wheel should be dressed just before the critical final surfaces are ground.
- "Spark Out" (additional traverses without feed-in) should be included.
- Grinding wheel should be a Carborundum wheel A545-J6-VII or equivalent.

## 4.3 Rolling Recommended Practice

The roller may be made to dimensions shown on drawing No. 404-279.

The surface should be free of any imperfections mounted so that its axis is parallel to, and in the same horizontal plane, as the journal axis.

Free to rotate but not allowed to wobble.

Clean the journal thoroughly with a petroleum solvent before rolling.

Apply a uniform coating of light machine oil over the surface to be rolled. Use Mobil Velocite D or Shell Tellus 22 or equivalent.

Rotate the axle at about 140 RPM.

Apply the roller against the rotating axle with a force of 22.3KN +/- 1.3KN

Feed the roller along the axle at a rate between 0.25 and 0.64mm per axle revolution.

Make only one pass across the journal, always feeding in the proper direction shown on drawing No. 404-279

Rolling reduces the diameter only about 0.0064mm.

## 5 Storage

Protect the rolled surface against damage until assembly. Coat with rust preventative to RSS 0031. If the axle is to be transported outside the location where it is machined then physical protection shall also be applied to the journal.

## 6 Referenced Documents

### 6.1 RIC Standards

RSS 0031 Wheel & Axle Reference Manual

### 6.2 RIC Drawings

404-279

### 6.3 Australian Standards

AS 2356 Information Processing