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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 JOURNAL BEARINGS**

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## **About This Standard**

This specification is based on the TRS 0128

TRS was formerly Specification F128 CME titled “Journal Bearings-Lined”

## **Version History**

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## 1 Scope

This specification provides for the manufacture and supply of lined lead bronze cast journal bearings for use in passenger and freight vehicles, and bronze cast suspension bearings for locomotives.

## 2 Manufacture

The bearings shall be manufactured strictly in accordance with the dimensions and details shown on the relevant drawing.

The raw bearing casting shall be cast in accordance with suitable methods and tolerances so as to give sufficient machining allowances to enable them to meet all dimensions and details shown on the drawing.

For lined bearings, the unlined bearings shall be bored and thoroughly tinned in accordance with the best standard practice. After lining, the bearings shall be accurately machined smooth to the dimensions shown on the drawing.

For unlined bearings, the bearings shall be accurately machined smooth to the dimensions on the drawing.

The bearings must not be ground or rubbed with abrasive materials following final machining.

## 3 Composition

Scrap may be used where it has been generated by the respective foundry as a part of normal casting practice (e.g. runners and risers ) and has only been generated from the use of material certified to the composition in this specification.

Certified material may be generated by recycling previously used bearings as well as by normal practices used in the manufacture of secondary copper base alloys or copper scrap being 99.8 % pure.

The bronze bearings shells shall be composed of the following

	Min %	Max %
Lead	14.0	20.0
Tin	6.0	7.0
Zinc	2.5	4.5
Copper	Balance	
Iron		0.3
Arsenic and Antimony		1.0
Aluminium		NIL

Phosphorus may be added during manufacture as a deoxidiser, in sufficient quantity to leave not more than 0.02% Phosphorus in the finished bearings.

White Metal for lining axlebox brasses shall be composed of the following:-

	<b>Min %</b>	<b>Max %</b>
Tin	3.0	5.0
Antimony	8.0	-
Tin and Antimony	-	14.0
Arsenic	-	0.2
Copper	-	0.5
Sum of tin, antimony, lead & arsenic	99.25	-
Copper and other impurities	-	0.75

## 4 Tests

Bearings from different casts of metal shall be kept separate by a traceable melt number so that chemical tests may be taken of each cast. One unlined bearing selected at random from each cast, shall be broken, either longitudinally or transversely, or both, in order to ascertain the uniformity of the grain of the material.

If this fracture shows separation or imperfect mixing of component parts or dirt spots, the cast represented by this specimen shall be rejected.

## 5 Chemical Analysis

A chemical analysis shall be taken, by or on behalf of the manufacturer, of each cast of the unlined bearings and of a small ingot representing the particular cast of the lining metal to be used. The chemical composition shall conform to the requirements of clause 3.

The Authority shall have the right to make, or have made, additional check analyses of the materials used. The chemical composition determined from each of such analyses shall conform to the requirements of Clause 3.

The sample for the chemical analysis of the bearing shall be taken from the unlined bearing referred to in Clause 4 and shall consist of a mixture of equal quantities of fine drillings taken at three points on the bearing, the holes being drilled right through and all surface metal discarded. The drillings shall be thoroughly mixed.

The sample for the chemical test of the lining metal shall consist of a mixture of equal quantities of fine sawings taken from two or more saw cuts through the ingot representing the cast. The sawings shall be thoroughly mixed.



## 6 Finish

All castings shall be sound and free from blow holes, dross and mechanical defects.

## 7 Facilities For Inspection

The Authority shall have free access to the works of the Manufacturer at all reasonable times. The Authority shall be at liberty to inspect the manufacture at any stage and to reject any material which does not conform to the terms of this Specification.

## 8 Testing Facilities

The Manufacturer shall supply the material required for testing free of charge and shall, at his own cost, furnish and prepare the necessary test pieces and supply labour and appliances for making all tests and for carrying out all gauging and weighing on his premises in accordance with the terms of this Specification. Failing facilities at his own works for making the prescribed tests, the Manufacturer shall bear the cost of carrying out the tests elsewhere, as agreed upon between the Authority and the Manufacturer.

## 9 Inspection And Rejection

Should any portion of the material show injuries or defects after delivery, such portion shall be rejected and the Manufacturer notified, and, provided that it has been properly treated by the Authority, it shall be replaced by the Manufacturer at his own cost.

The Manufacturer shall supply a certificate of conformance and results of tests if requested. Records of all tests shall be kept for a period of 5 years and be available upon request.

## 10 Suspension Bearings - Allowable Porosity

The allowable porosity limits for locomotive plain suspension bearings shall be as follows:-

porosity depth not to exceed 3 mm at any point.

surface porosity not to exceed 5% of the total projected surface area.

no porosity shall be closer than 10 mm to any edge including the window opening for the wick assembly.

## 11 Traceability

The manufacturer shall stamp each bearing with a batch or melt number so that bearings from different casts of metal can be identified.

Batch or melt numbers shall be stamped on the finished bearing in order to maintain traceability records.