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RAILWAY PERMANENT WAY MATERIAL
Part 4—FISHBOLTS AND NUTS

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Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

Railways of Australia Committee

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RAILWAY PERMANENT WAY MATERIAL

Part 4 FISHBOLTS AND NUTS

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PREFACE

This Standard was prepared by the Association's Committee on Railway Permanent Way Materials. It is a revision and amalgamation of AS 1085.4—1979*, AS 1085.5—1979† and AS 1085.6—1979‡ in consequence of which—

(a) it is designated AS 1085.4—1988;

(b) it supersedes AS 1085.4—1979; and

(c) both AS 1085.5—1979 and AS 1085.6—1979 are now withdrawn.

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* AS 1085, *Railway permanent way material*, Part 4—1979, *Non-heat-treated fishbolts (interference fit)*
† AS 1085, *Railway permanent way material*, Part 5—1979, *Heat-treated fishbolts (medium thread class)*
‡ AS 1085, *Railway permanent way material*, Part 6—1979, *Nuts for fishbolts*

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
RAILWAY PERMANENT WAY MATERIAL

PART 4: FISHBOLTS AND NUTS

1 SCOPE. This Standard specifies requirements for steel non-heat-treated or heat-treated fishbolts and nuts for use in conjunction with steel rails and fishplates rolled in accordance with AS 1085.1 and AS 1085.2.

NOTE: Nuts to be used for interference fit fishbolts require to be batched with near to zero variation in thread size. It is essential that the purchaser supply the manufacturer with certain information when enquiring about or ordering nuts to this Standard. Purchasing guidelines are given in Appendix A.

2 REFERENCED DOCUMENTS. The documents below are referred to in this Standard.

AS
1050 Methods for the analysis of iron and steel
1085 Railway permanent way material
Part 1: Steel rails (AS 1085.1)
Part 2: Fishplates (AS 1085.2)
1213 Iron and steel—Methods of sampling
1252 High-strength steel bolts with associated nuts and washers for structural engineering
1275 Metric screw threads for fasteners
1391 Methods for tensile testing of metals
1442 Carbon steels and carbon-manganese steels—Hot-rolled bars and semi-finished products
1654 Limits and fits for engineering
1721 General purpose metric screw threads
1815 Method for Rockwell hardness test
Part 1: Testing of metals (AS 1815.1)
1816 Method for Brinell hardness test
Part 1: Testing of metals (AS 1816.1)
1817 Method for Vickers hardness test
Part 1: Testing of metals (AS 1817.1)
2706 Numerical values—Rounding and interpretation of limiting values
K1 Methods for the sampling and analysis of iron and steel

3 CHEMICAL COMPOSITION.

3.1 General. The steel used for the manufacture of fishbolts and nuts shall comply with the requirements of AS 1442.

3.2 Material specification. The steel grades used shall be selected from appropriate grades in the tables of AS 1442, and comply with the chemical composition limits (cast analysis) as set out in Table 1 below.

TABLE 1

CHEMICAL COMPOSITION CAST ANALYSIS

percent

Product	Carbon	Manganese	Phosphorus	Sulphur
Fishbolt	0.55 max.	—	0.05 max.	0.05 max.
Nut	0.58 max.	0.25 min.	0.06 max.	0.15 max.

4 FISHBOLTS.

4.1 Manufacture. Fishbolts may be produced by hot or cold forging with or without secondary machining.

Screw threads shall be formed by thread rolling or thread cutting.

NOTE: When the threads are produced by rolling, small laps are commonly present at the crests and are generally of a magnitude which is not detrimental to the performance of the bolt. A lap formed at the crest of the thread, perpendicular to the axis of the thread of the fishbolt, is not considered cause for rejection if the lap does not exceed 33 percent of the depth of thread.

4.2 Shape, dimensions and finish. The shape and dimensions of fishbolts shall be in accordance with Figure 1 and the following requirements:

(a) Bolts shall be cleanly finished, sound and free from defects detrimental to their end use.

(b) Ends of fishbolts shall be either reasonably square with the centreline of the shank or rounded (see Figure 1). Where the ends of the fishbolts are finished square, a nominal 45° chamfer is to be provided to a depth slightly exceeding the depth of the thread.

4.3 Mechanical properties. The mechanical properties of non-heat-treated fishbolts shall comply with Table 2 and of heat-treated fishbolts with Table 3.

Heat-treated fishbolts shall be hardened and then tempered by being uniformly reheated to a minimum temperature of 450°C.

TABLE 2

MECHANICAL PROPERTIES OF NON-HEAT-TREATED FISHBOLTS

Property	Requirement
Minimum tensile strength	540 MPa
Minimum yield stress	270 MPa
Minimum elongation on $5.65\sqrt{So}$*	16%

TABLE 3

MECHANICAL PROPERTIES OF HEAT-TREATED FISHBOLTS

Property	Requirement
Minimum tensile strength	830 MPa
Stress at permanent set limit, Rr 0.2	640 MPa
Minimum elongation on $5.65\sqrt{So}$*	14

* See Figure 2.

4.4 Screw threads. Profile and basic dimensions of the fishbolt screw threads shall be in accordance with the ISO coarse series 6g for external screw threads as given in AS 1275 and AS 1721. For non-heated-treated fishbolts requiring an interference fit, deviation and manufacturing tolerances shall be such that the torque requirements of Clause 4.5.3 are satisfied.