AS 4397—2007
Reconfirmed 2017

AS 4397—2007

Australian Standard®

Electroplated coatings of zinc on steel fasteners with imperial threads

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This Australian Standard® was prepared by Committee MT-009, Metal Finishing. It was approved on behalf of the Council of Standards Australia on 6 February 2007.
This Standard was published on 8 March 2007.

The following are represented on Committee MT-009:

- Australian Institute of Metal Finishing
- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Department of Defence
- Galvanizers Association of Australia
- The Royal Australian Chemical Institute
- Society of Automotive Engineers, Australia

This Standard was issued in draft form for comment as DR 06594.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through public comment period.

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 4397—2007
Electroplated coatings of zinc on steel fasteners with imperial threads

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Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 20 March 2017.

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Australian Standard®

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Originated as AS A132.2—1963.
Previous edition AS 4397—1996.
Second edition 2007.

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Published by Standards Australia, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 8099 7

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee MT-009, Metal Finishing, to supersede AS 4397—1996, *Electroplated coatings of zinc on steel fasteners with imperial threads*. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to specify requirements for zinc coatings on components with imperial threads for sectors of industry that have not converted to using metric threaded components.

The objective of this edition is to revise the zinc coating specifications and the means for complying with the Standard.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

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FOREWORD

The Standard specifies the electrodeposition of zinc on threaded steel components. The nature of threaded items presents a number of problems which necessitate special care in the specification, application and inspection of electrodeposited coatings. Factors to consider include the following:

(a) The thickness of an electrodeposit on parallel screw threads must be sufficient to provide the required resistance to corrosion but be not so great as to prevent assembly. Specifications for the electroplating of threaded items, therefore, are required to have both a maximum and a minimum value for the coating thickness.

(b) Because of the geometry of screw threads, the theoretical change in pitch diameter caused by a plated deposit is several times the coating thickness. This change in pitch diameter depends on flank angles. In practice, it is generally greater than the theoretical value because of the tendency for the coating to be thicker on the crests of the threads resulting in a change of thread flank angle.

Figure 1 diagrammatically shows a coating which has been plated on an external screw thread; t is the thickness of coating, and θ is the angle between flanks of the thread. A coating thickness t on the external thread results in an increase in pitch diameter of $2t$ cosec $\theta/2$, which for a thread of included angle of 60 degrees increases the pitch diameter by an amount equal to $4t$.

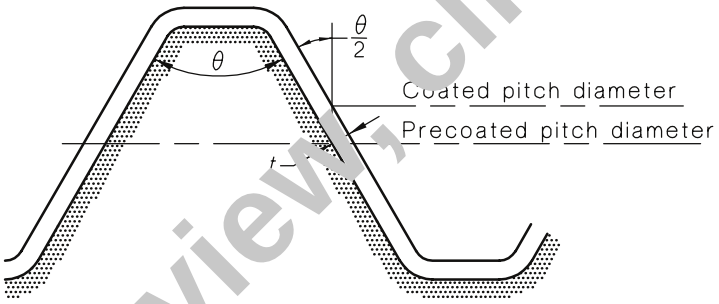

FIGURE 1 THEORETICAL CHANGE IN PITCH DIAMETER RESULTING FROM DEPOSIT OF THICKNESS (t)

(c) With any form of electroplating, the coating tends to be preferentially deposited on projections and to be much thinner in any recess. For screws and bolts, the coating is thicker on the extremities and on the threaded ends of the items than on the centre of the bolt length. The longer the bolt in proportion to its diameter, the greater is this tendency. Fortunately, these extremities are the positions which are most significant in the ultimate service of the screw or bolt. Similarly for nuts, the thickness of coating on the threads is very much greater at the ends than on the interior threads. The greatest thickness will be on the outer surfaces which are most significant in service. In practice, thin coatings on the interior threads do not normally cause serious problems if sacrificial coatings are used, because they are normally in contact with the thicker coating on the external threads of the mating fastener. Furthermore, some slight variation in coating distribution occurs on the individual thread flanks, the tendency being for heavier deposition of coating at the crest of the thread than at the root. The effect of these variations is to increase the pitch diameter more than the theoretical value (see Item (b)). The clearance between an external and an internal thread is diagrammatically shown in Figure 2.

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