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1992 ED.

Australian Standard®
3508.4—1987

PRINTED BOARD ASSEMBLIES—
Part 4—ACCEPTABILITY OF SOLDER, PRINTED BOARDS AND SOLDERED JOINTS—PICTORIAL REPRESENTATION

3508 **Printed board assemblies**
3508.4—1992 **Acceptability of printed boards and soldered joints—Pictorial representation** 19pp *F*

Pictorially illustrates preferred, acceptable and unacceptable soldered joints on printed circuit boards.

*Committee TE/6. **Supersedes AS 3508.4—1990 which was withdrawn April 1991. Publication date 1992-04-16.** ISBN 0 7262 7382 1.*

This Australian Standard was prepared by Committee TE/6, Printed Circuits. It was approved on behalf of the Council of the Standards Association of Australia on 24 September 1987 and published on 7 December 1987.

The following interests are represented on Committee TE/6:

Australian Tin Information Centre
Confederation of Australian Industry
Department of Defence
Department of Industry, Technology and Commerce
Department of Transport and Communications
Institution of Radio and Electronics Engineers Australia
Telecom Australia.

MIC ; Please annotate your copy of this std.

Standards Association of Australia

Memo to: Whom it may concern

From: Anne

Date: 890503

File No:

Re: AS 3508.4 - 1987

Clause 5.2 of this standard contains a reference to AS 2546.2. This standard was not available at the time of publication & is still not published. It is planned that the revision of AS 3508.4 will delete this reference. Information from Ron Profitt today is that users should ignore this reference in the current standard.

Anne.

Copy in original & dup, copy to MIC

A31

AUSTRALIAN STANDARD

PRINTED BOARD ASSEMBLIES

Part 4

ACCEPTABILITY OF SOLDER, PRINTED BOARDS AND SOLDERED JOINTS— PICTORIAL REPRESENTATION

AS 3508.4—1987

First published as AS 3508.4 1987

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 4758 8

PREFACE

This Standard was prepared by the Association's Committee on Printed Circuits. It is based on Telecom Specification 1333—1981 with some small amendments and additions. Grateful acknowledgement is made of the assistance received from this source.

The purpose of the Standard is to provide in pictorial form examples of minimum acceptability standards of quality for soldered joints contained in printed board assemblies (PBAs). The Telecom Specification originally set standards to be met by PBAs to be supplied to Telecom, either as individual PBAs or when mounted in equipment. The committee adopted these recommendations for general acceptance throughout the telecommunications and electronics industry for demonstrating standards of acceptance for use in equipment in general in the course of manufacture, installation, modification or repair.

The Standard confines its attention to the mounting of discrete components on single-sided or plated-through-hole boards and to presentation of the solder side of the board as soldered by mass soldering techniques such as wave-soldering. Consideration will be given to extending the coverage to other techniques of mass-soldering electrical and electronic equipment, including techniques applicable to surface mounting of components.

A number of the features of PBAs assessed visually in this Standard are also the subject of discussion in a Standard on preparation, handling and assembly of PBAs, currently in course of preparation. This Standard provides visual criteria for the defects described in the Standard under preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
PRINTED BOARD ASSEMBLIES

PART 4—ACCEPTABILITY OF SOLDER, PRINTED BOARDS AND SOLDER JOINTS—PICTORIAL PRESENTATION

1 SCOPE. This Standard defines the minimum standards of workmanship required of printed board assemblies (PBAs) supplied as individual PBAs or when mounted in equipment, complying with AS 2546.1 or AS 2546.3, as assessed by visual examination.

2 APPLICATION. The extent of the use being made of PBAs in modern equipment make their degree of quality a prime factor in the equipment's satisfactory and reliable performance. This Standard provides the criteria for their acceptability for use by the purchaser.

The Standard applies to all PBAs for telecommunications or electronics equipment during manufacture, installation, modification or repair.

3 REFERENCED STANDARDS.

AS 2546 Printed Boards.
- AS 2546.1 General Requirements and Test Methods.
- AS 2546.3 Design and Use.

AS 3250 Approval and Test Specification—Mains Operated Electronic and Related Equipment for Household and Similar General Use.

4 SOLDER JOINTS—REQUIREMENTS.

4.1 Viewing conditions. The illustrations in this Standard provide the visual standards for assessing the acceptability of the solder joints in PBAs. The normal viewing conditions recommended are lighting levels of 600 lx to 800 lx with an optical magnification of 3× (see AS 2546.1, Test 1(a)).

4.2 Reference conditions. In case of disputes the following viewing conditions shall be used:

(a) *Illumination.* Lighting conditions shall be sufficient to provide an illuminance of 1600 lx at the workpiece.

(b) *Optical magnification.* The optical magnifying device used shall be capable of a magnification of 10× as agreed between the purchaser and the supplier (AS 2546.1: Test 1(b)).

4.3 Percentage values. Where percentage values are quoted (e.g. percentage of soldered area showing wetting faults) these shall be estimated from visual inspections. In the case of disputes more accurate means of assessment may be used.

4.4 Classifications. The following categories are demonstrated by illustrations in this Standard:

(a) *Preferred*—the standard condition which the manufacturer is expected to achieve throughout his production.

(b) *Acceptable*—a departure from the standard condition but still within acceptable limits.

Acceptable quality shall not be used as the standard for manufacturing.

(c) *Unacceptable*—non-conformance with the standard of workmanship.

The appropriate Defect Classification List (DCL) and Acceptable Quality Level (AQL) for the equipment concerned shall be used to determine the seriousness of the defect and the number of defects acceptable.

4.5 Clinching. The purpose of clinching is to stop the components from lifting during the wave-soldering operation. The degree to which this is done is governed by factors such as the clearance between the lead and the hole, the particular insertion method adopted, e.g. hand insertion or machine insertion. Other degrees of clinching are appropriate and proper, although 90° clinching is undesirable where components may need to be replaced at a later stage.

The photographs of soldered joints depict the component leads as having either no clinch or a 45° clinch. It is not implied however, that these are in any way favoured methods nor that other methods of fixing cannot be adopted.

5 ILLUSTRATIONS.

5.1 Solder quantity of a joint. A joint with the ideal quantity of solder displays the following characteristics:

(a) The solder fillet is continuous around the lead, is in full contact with the available land and terminal circumference and has a concave outer surface.

(b) The contours of the wire or lead are visible below the surface. Joints with no solder are unacceptable.

Joints with insufficient solder are unacceptable because of reduced mechanical strength and poor electrical connections/conductivity. The solder miniscus must be higher than the land surface. Adequate wetting of land and lead must be visible.

Joints with an excess of solder are unacceptable because they cannot be properly inspected with respect to adequate wetting of the solder land and lead.