AS 3990—1993
Reconfirmed 2016

Australian Standard®

Mechanical equipment—Steelwork

This Australian Standard was prepared by Committee ME/5, Cranes (Balloted by ME/1, Boilers and Pressure Vessels; ME/4, Lift Installations; ME/5, Cranes; ME/18, Mining Equipment; ME/38, Gas and Liquid Petroleum Piping Systems; ME/43, Bulk Handling Equipment). It was approved on behalf of the Council of Standards Australia on 24 February 1993 and published on 17 May 1993.

The following interests are represented on the balloting Committees:

Australian commerce associations

Australian development associations

Australian energy associations

Australian engineering associations

Australian Federal authorities

Australian importers associations

Australian industry associations

Australian manufactures associations

Australian marketing associations

Australian mining associations

Australian research associations

Australian Steamship Owners Federation

Australian State authorities

Australian trade associations

Australian universities

Australian utilities associations

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 3990—1993
Mechanical equipment—Steelwork

RECONFIRMATION NOTICE

Technical Committee ME-005 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 1 November 2016.

The following are represented on Technical Committee ME-005:

Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institute for Non-Destructive Testing
Bureau of Steel Manufacturers of Australia
Concrete Pumping Association of Australia
Crane Association of New Zealand
Crane Industry Council of Australia
Department of Industry, Skills and Regional Development (NSW)
Department of Justice and Attorney General (QLD)
Electricity Engineers Association (New Zealand)
Engineers Australia
Institution of Professional Engineers New Zealand
SafeWork NSW
Transport for NSW
Worksafe Division, Department of Commerce, Western Australia
Worksafe New Zealand
WorkSafe Victoria

NOTES

Australian Standard®

Mechanical equipment—Steelwork

AS 3990 first published in part as AS CAI—1933.
Second edition 1939.
Revised and issued as SAA Int. 351—1952.
Revised and issued as AS CAI—1968.
Fourth edition 1972.
AS 1250 first published 1972.
AS CAI—1972 and AS 1250—1972 revised, amalgamated and issued as AS 1250—1975.
AS CAI—1972 withdrawn 1976.
Third edition as AS 1250—1981.
Revised and redesignated in part as AS 3990(Int)—1991.
Revised and issued as AS 3990—1993.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140
ISBN 0 7262 8091 7

PREFACE

This Standard was prepared by the Standards Australia Committee on Cranes and balloted by the Standards Australia Committees for Boilers and Unfired Pressure Vessels, Lift Installations, Cranes, Mining Equipment, Gas and Liquid Petroleum Piping Systems, and Bulk Handling Equipment to provide a working stress method for the design of mechanical equipment steelwork. AS 1250—1981, *SAA Steel Structures Code*, which provided a working stress method, was superseded by AS 4100—1990, *Steel structures*, which provides the limit states design method.

Although the limit states design method (AS 4100) is the preferred method of designing steelwork, it is necessary to continue the working stress design method (this Standard) for certain mechanical equipment where the application Standards allow. This is particularly so for mechanical equipment where the equivalent international Standards use the working stress design method.

While the editorial style and layout have been updated, this Standard incorporates the minimum changes necessary to AS 1250—1981, *SAA Steel Structures Code*. Amendments 1 and 2 have been incorporated into the text. Section 10 has been deleted, Section 11 renumbered and new Appendices F and G added. Clauses 1.1, 2.2, 3.3.1, 3.3.5, 3.5.2, 10.1.1, 10.1.4 and 10.1.5; and Appendix C have been revised.

The issue of this Standard follows its publication as an Interim Standard in December 1991. Section 1 and Appendix G have been revised, a new Application Clause included and Reference Standards updated to current editions.

Attention is drawn to the following Standards which may be required for use in connection with this Standard:

AS
1110 ISO metric hexagon precision bolts and screws

1111 ISO metric hexagon commercial bolts and screws

1112 ISO metric hexagon nuts, including thin nuts, slotted nuts and castle nuts

1163 Structural steel hollow sections

1170 SAA Loading Code
1170.1 Part 1: Dead and live loads and load combinations
1170.2 Part 2: Wind loads
1170.3 Part 3: Snow loads

1252 High strength steel bolts with associated nuts and washers for structural engineering

1275 Metric screw threads for fasteners

1302 Steel reinforcing bars for concrete

1303 Steel reinforcing wire for concrete

1379 The specification and manufacture of concrete

1391 Methods for tensile testing of metals

1418 SAA Crane Code

1554 SAA Structural Steel Welding Code
1554.1 Part 1: Welding of steel structures
1554.2 Part 2: Arc stud welding (steel studs to steel)
1554.5 Part 5: Welding of steel structures subject to high levels of fatigue loading

1559 Fasteners—Bolts, nuts and washers for tower construction

1594 Hot-rolled steel flat products

1627 Metal finishing—Preparation and pretreatment of surfaces
1627.7 Part 7: Hand tool cleaning of metal surfaces

2074 Steel castings

2121 SAA Earthquake Code

2214 SAA Structural Steel Welding Supervisors Certification Code

2312 Guide to the protection of iron and steel against exterior atmospheric corrosion

2812 Welding, brazing and cutting of metals—Glossary of terms

3600 Concrete structures

3678 Structural steel—Hot-rolled plates, floorplates and slabs

3679 Structural steel
3679.1 Part 1: Hot-rolled bars and sections
3679.2 Part 2: Welded sections

4100 Steel structures

BS
5135 Metal-arc welding of carbon and carbon manganese steels

Supplement 1 (PD 3343) to BS 449,
Part 1: Recommendations for design (withdrawn)

CONTENTS

Page

STANDARDS AUSTRALIA

Australian Standard

Mechanical equipment—steelwork

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard applies to the design, fabrication, erection, repair and alteration of steelwork associated with boilers and pressure vessels, lifts, cranes, mining equipment, gas and liquid petroleum piping systems, bulk handling equipment and the like, in accordance with the working stress design method.

The Standard does not apply to the following structures and materials:

(a) Road and railway bridges.

(b) Steel elements, other than packers, less than 3 mm thick.

(c) Steel for which the value F_Y used in design exceeds 450 MPa.

(d) Cold-formed members other than those complying with AS 1163.

Steelwork may be designed to—

(i) the limit states design method of AS 4100; or

(ii) the working stress design method of AS 3990 (this Standard).

NOTE: It is intended that the working stress method will be phased out in Australia as it is phased out internationally.

1.2 APPLICATION This Standard is intended to apply to steelwork associated with mechanical equipment such as boilers and pressure vessels, lifts, cranes, mining equipment, gas and liquid petroleum piping systems and bulk handling equipment.

1.3 STANDARDS Unless otherwise noted, a Standard referred to in this Standard is the current edition thereof.

1.4 NEW MATERIALS OR METHODS This Standard shall not be interpreted to prevent the use of materials or of methods of design or construction not specifically referred to herein.

NOTE: It will be necessary to seek approval from the Building Authority for the use of new materials or methods.

1.5 DESIGN AND SUPERVISION

1.5.1 Design The design of a structure or the part of a structure to which this standard is applied shall be the responsibility of an engineer experienced in the design of such structures.

For the purposes of this Standard the term ‘Design Engineer’ shall mean the Engineer responsible for design and shall include his representative.