AS 3995—1994

Australian Standard®

Design of steel lattice towers and masts

This Australian Standard was prepared by Committee BD/73, Design of Steel Lattice Towers and Masts. It was approved on behalf of the Council of Standards Australia on 20 April 1994 and published on 11 July 1994.

The following interests are represented on Committee BD/73:

Association of Consulting Engineers, Australia
AUSSAT
Bureau of Steel Manufacturers of Australia
CSIRO, Division of Building, Construction and Engineering
Electricity Supply Association of Australia
Electricity Trust of South Australia
Institution of Engineers, Australia
OPTUS
OTC
Telecom
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PREFACE

This Standard was prepared by the Standards Australia Committee on Design of Steel Lattice Towers and Masts to supersede AS 3995(Int)—1991, *Design of steel lattice towers and masts*.

In addition to those issues covered by the previous Interim Standard, this Standard now incorporates the following:

(a) Design and analysis of guyed lattice towers and masts.

(b) Design of cable tension members.

(c) Footing design.

(d) Criteria for analysis of existing structures.

Guidance relating to earthquake design, footing design, maintenance and access to steel lattice towers and masts is given in the Appendices.

Revisions have been made to the wind load specifications described in Section 2. These changes are the result of recent research on the effect of ancillaries on the wind load.

The design of cold-formed steel, other than those complying with AS 1163, *Structural steel hollow sections*, and AS 1664, *Rules for the use of aluminium in structures (known as the SAA Aluminium Structures Code)*, is not covered by this 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.

CONTENTS

STANDARDS AUSTRALIA

Australian Standard

Design of steel lattice towers and masts

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard sets out the procedures for determination of design wind speeds and wind loads, and other appropriate standards to be used in the structural design of steel lattice towers and masts, with or without ancillaries such as antennas, for communication purposes. It also applies to other lattice towers and masts where the predominant load is wind load on the structure. It further sets out the basis for the strength assessment of members and connections of lattice towers and masts.

This Standard is not intended to apply to the structural design of transmission line structures. The design of cold-formed steel, other than those complying with AS 1163, and aluminium is not covered by this Standard.

For all other aspects of design not specifically mentioned herein, reference shall be made to the appropriate Australian Standards including AS 1170 Parts 1 and 2, AS 1554, AS 1559, AS 1650, AS 3569 and AS 4100.

NOTES:

1 A general framework for maintenance and inspection of existing structures is given in Appendix A.

2 Recommendations for access to steel lattice towers and masts are given in Appendix B. If required by the Health and Safety Authority, provision of safe access to such structures should be considered at the design stage.

1.2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS	
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
1170.4	Part 4: Earthquake loads
1538	Cold-formed Steel Structures Code
1554	SAA Structural Steel Welding Code
1559	Fasteners—Bolts, nuts and washers for tower construction
1650	Hot-dipped galvanized coatings on ferrous articles
1657	Fixed platforms, walkways, stairways and ladders—Design, construction and installation
1664	SAA Aluminium Structures Code
2759	Steel wire rope—Application guide
2772	Radiofrequency radiation
2841	Galvanized steel wire strand

AS
3569 Steel wire ropes

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

4100 Steel structures

BS
8100 Lattice towers and masts
8100.1 Part 1: Code of practice for loading
8100.2 Part 2: Guide to the background and use of Part 1 'Code of practice for loading'

1.3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

1.3.1 Bracing members—members other than legs carrying the horizontal forces due to the imposed loads on the structure.

1.3.2 Leg members—members forming the main load-bearing components of the structure.

1.3.3 Linear ancillaries—ancillaries to the structure that are very long in relation to their sectional dimensions, and for which sectional drag force coefficients are available.

1.3.4 Secondary bracing members—members used to reduce the effective length of other members.

1.4 NOTATION Symbols used in this Standard are given in Table 1.4.

Unless specified otherwise, expressions and equations in this Standard are such that any consistent set of dimensional units may be used.

NOTES:

1 In Section 2, the typical set of units to be used for length, force and pressure are metres (m), kilonewtons (kN) and kilopascals (kPa) respectively.

2 In Section 3, the typical set of units to be used for length, force and stress are millimetres (mm), newtons (N) and megapascals (MPa) respectively.

3 In Appendix D, the typical set of units to be used for length, mass and force are metres (m), kilograms (kg) and newtons (N) respectively.

TABLE 1.4
NOTATION

Quantity symbol	Term	Text reference
A	area of cross-section	Clause 3.3.1
A_a	reference area of any ancillaries attached to a tower section	Clause 2.2.8.3
A_e	effective compression section area	Clauses 3.3.2, 3.3.3
A_n	net area of a cross-section	Clause 3.4.2.2
A_o	nominal plain shank area of a bolt	Clause 3.5.4.2
A_z	projected area of tower members in one face of a tower section, without ancillaries (except for Case (a) in Clause 2.2.8.3)	Clauses 2.2.6, 2.2.8.2, 2.2.8.3
a	constant in expression for K_{in} for cylindrical ancillary inside a square tower	Clause 2.2.8.4

(*continued*)