



Built-in components for masonry construction

Part 3: Lintels and shelf angles (durability requirements)



AS 2699.3:2020

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- Bureau of Steel Manufacturers of Australia
- Concrete Masonry Association of Australia
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Preface

This Standard was prepared by the Standards Australia Committee BD-028, Masonry Wall Ties and Accessories, to supersede AS/NZS 2699.3—2002.

This Standard is the third part of a three-part series on masonry wall ties, connectors and accessories, and lintels and shelf angles. The series comprises the following:

AS 2699.1, *Built-in components for masonry construction, Part 1: Wall ties*

AS 2699.2, *Built-in components for masonry construction, Part 2: Connectors and accessories*

AS 2699.3, *Built-in components for masonry construction, Part 3: Lintels and shelf angles (durability requirements)*

The objective of this Standard is to provide manufacturers of lintels and shelf angles with specifications to achieve durability requirements, and methods for testing corrosion resistance.

Durability requirements for lintels and shelf angles are specified in AS 3700, *Masonry structures* and AS 4773.1, *Masonry in small buildings, Part 1: Design*, and AS 4773.2, *Masonry in small buildings, Part 2: Construction*.

The terms "normative" and "informative" are used in Standards to define the application of the appendices to which they apply. A "normative" appendix is an integral part of a Standard, whereas an "informative" appendix is only for information and guidance.

Notes to clauses in this Standard are for information and guidance only and conformance with them is not a requirement of the Standard.

This Standard includes a commentary on some of the clauses and tables. The commentary directly follows the relevant clause or table, is designated by "C" preceding the clause/table number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.

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NOTES

Australian Standard®

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Section 1 Scope and general

1.1 Scope

This Standard specifies requirements for the durability performance of steel lintels and shelf angles to be built into masonry.

This Standard applies to lintels and shelf angles used in masonry construction described in AS 3700, AS 4773.1 and AS 4773.2.

NOTE 1 AS 2699.1 specifies the durability performance and test procedures for structural performance of wall ties used in masonry construction.

NOTE 2 AS 2699.2 specifies the durability performance and test procedures for structural performance of connectors and accessories used in masonry construction.

NOTE 3 Throughout this Standard, lintel signifies lintel or shelf angle, unless stated otherwise.

NOTE 4 The durability classifications employed in this Standard are compatible with the environments specified in ISO 9223, AS 4312—2008, AS 3700, AS 4773.1 and AS 4773.2.

NOTE 5 This Standard does not cover requirements for structural design or the method of its determination. Details for these are given by AS 3700, AS 4773.1, AS 4100, and AS/NZS 4600.

NOTE 6 Design and installation requirements for lintels and shelf angles are specified in AS 3700, AS 4773.1 (design) and AS 4773.2 (construction).

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitute requirements of this document:

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1627.4, *Metal finishing—Preparation and pretreatment of surfaces, Part 4: Abrasive blast cleaning of steel*

AS 2331.1.4, *Methods of test for metallic and related coatings, Method 1.4: Local thickness tests—Magnetic induction and eddy current methods*

AS 3700, *Masonry structures*

AS 3894.3, *Site testing of protective coatings, Method 3: Determination of dry film thickness*

AS 4773.1, *Masonry in small buildings, Part 1: Design*

AS 4773.2, *Masonry in small buildings, Part 2: Construction*

AS/NZS 3750.6, *Paints for steel structures, Part 6: Full gloss polyurethane (two-pack)*

AS/NZS 3750.9, *Paints for steel structures, Part 9: Organic zinc-rich primer*

AS/NZS 3750.9, *Paints for steel structures, Part 14: High-build epoxy (two-pack)*

AS/NZS 4680, *Hot-dip galvanized (zinc) coatings on fabricated ferrous articles*

AS/NZS 4791, *Hot-dip galvanized (zinc) coatings on ferrous open sections, applied by an in-line process*

AS 4848.1, *Application specifications for coating systems, Part 1: Single coat inorganic (ethyl) zinc silicate—Solvent-borne*

ISO 2178, *Non-magnetic coatings on magnetic substrates — Measurement of coating thickness — Magnetic method*

ISO 19840, *Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Measurement of, and acceptance criteria for, the thickness of dry films on rough surfaces*

AS ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ASTM A240/A240M, *Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications*

1.3 Terms and definitions

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

1.3.1

batch

clearly identifiable collection of units, manufactured consecutively or continuously under the same conditions, using material or compound to the same specification

1.3.2

corrosivity category

C

standardized rating of corrosivity of atmosphere in relation to the one-year corrosion effect on steel and zinc

Note 1 to entry: The classifications C1 to C5 and CX are individually defined by reference to corrosivity of the atmosphere according to ISO 9223 and AS 4312—2008.

Note 2 to entry: A method for estimating corrosivity category is given in [Appendix D](#).

1.3.3

design life

period for which the lintel is expected to fulfil its intended function

Note 1 to entry: See [Clause 1.3.10](#).

1.3.4

distributor

any business entity that provides a point/source of supply of a lintel to the market

1.3.5

duplex coating

coating system that provides corrosion protection through the addition of an organic barrier coating applied over galvanized steel

1.3.6

durability class

R

identifies the level of corrosion protection provided to a lintel to meet the performance condition for the design life of a structure

Note 1 to entry: The classifications R1 to R5 are individually defined by reference to exposure conditions given in AS 3700, AS 4773.1 and AS 4773.2.

1.3.7**factory production control****FPC**

comprises operational techniques and all measures necessary to regulate and maintain the conformity of the product to the requirements of a Standard

1.3.8**galvanized coating**

protective zinc coating alloyed to the steel substrate and applied by hot-dip immersion in molten zinc of at least 98 % purity

1.3.9**inorganic zinc silicate**

coating consisting essentially of a dispersion of metallic zinc powder in an inorganic silicate medium

1.3.10**lintel**

loadbearing beam that provides structural support for the masonry and other loads above a window, door or other opening of a building

1.3.11**lot**

group of lintels of a single type with specific characteristics and dimensions, presented for sampling at the same time

1.3.12**manufacturer**

business entity providing the total, substantive or final production/assembly process of the lintel

1.3.13**manufacturing lot****manufacturing batch**

quantity of lintels of a single type with specific characteristics and dimensions, processed through the same or similar steps at the same time or over a continuous time period from a process with FPC

1.3.14**manufacturing lot number**

unique alphanumeric code assigned by the lintel manufacturer to a manufacturing lot enabling its traceability throughout the entire production operation, including incoming materials control and all processes defined in the FPC

1.3.15**organic coating**

protective coating, based on one or more organic resins, in liquid or powder form, applied to the substrate

1.3.16**purchaser**

organization or person who buys lintels, but is not necessarily the user

1.3.17**sample**

one of more units of product drawn from a batch or lot, selected at random without regard to quality

Note 1 to entry: The number of units of product in the sample is the sample size.

1.3.18**shall**

indicates that a statement is mandatory

1.3.19**shelf angle**

structural angle fixed to a supporting wall and used to support a vertical masonry veneer

1.3.20**should**

indicates a recommendation

1.3.21**specimen**

specially prepared item for testing, consisting of a lintel embedded in masonry, to simulate the design service condition or, where more than one type of service condition applies, the most demanding

1.3.22**statistical process control****SPC**

application of statistical methods to the monitoring and control of a process to ensure that it operates at its full potential to produce conforming product

1.3.23**supplier**

organization that provides lintels

Note 1 to entry: The supplier may be the manufacturer, an importer or a distributor.

1.3.24**trace lot number**

unique alphanumeric code assigned by a lintel manufacturer or distributor, which identifies the original manufacturing lot number in an unequivocal manner

1.3.25**type testing**

testing performed to prove that the lintel is capable of conforming to the requirements of this Standard

1.4 Product conformity evaluation

Product conformity to this Australian Standard shall be evaluated in accordance with [Appendix B](#).

If the evaluation of the product conformity is not completed, or the product does not fulfil the requirements stated in this Standard, claims shall not be made that products meet the requirements of this Standard.

1.5 New technologies

This Standard shall not be interpreted as preventing the use of materials or methods of manufacture not specifically referred to herein, provided the specified performance criteria are met.

Section 2 Performance criteria

2.1 Scope of section

This Section sets out specific requirements for the manufacture of lintels.

2.2 Aim

The performance criteria set out in this Section are intended to ensure that —

- (a) the lintels are durable and serviceable, and thus retain adequate strength; and
- (b) there is no loss of function of the lintels, or adverse effect on the masonry, over a design life of not less than 50 years.

NOTE It is essential that lintels attached to supporting walls be installed so that they do not permit water transfer across the cavity to the supporting frame. For example, flashing or a drip mechanism may be used to shed water into the cavity.

2.3 Safety

Features that present a safety hazard, e.g. sharp edges and burrs, shall be removed. In the case of coated lintels, these features shall be removed prior to coating.

2.4 Durability

2.4.1 General

Materials for the manufacture of lintels shall be either inherently corrosion resistant or suitably treated to ensure sufficient durability to achieve design life.

2.4.2 Damage

All cut ends and any damaged areas on coated lintels shall be repaired prior to installation to ensure that the durability criteria are met. The minimum acceptable repair requirements and methods shall be in accordance with [Appendix F](#).

2.4.3 Classification of materials

Lintels manufactured from any material shall be identified as durability classes R1 to R5, as defined in AS 3700, AS 4773.1, and AS 4773.2, by application of the acceptance criteria in [Clause 2.4.4](#).

2.4.4 Durability criteria for lintels

Lintels shall suffer no loss in serviceability over the design life of the structure (see [Clause 2.2](#)) when subjected to the following in-service conditions:

- (a) *R1 and R2* —
 - (i) all interior locations;
 - (ii) exterior locations more than 1 km from a non-surf coast and not classed as industrial;
 - (iii) exterior locations more than 10 km from a surf coast and not classed as industrial;
 - (iv) protected exterior locations with a coating above the damp proof course (DPC) or a membrane below the DPC in any atmospheric environment; or