AS/NZS 3500.3.2:1998

Australian/New Zealand Standard™

National plumbing and drainage

Part 3.2: Stormwater drainage—Acceptable solutions

Building Code of Australia primary referenced Standard

ABCB
Australian Building Codes Board

STANDARDS AUSTRALIA

STANDARDS NEW ZEALAND

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WS/20, Stormwater. It was approved on behalf of the Council of Standards Australia on 1 May 1998 and on behalf of the Council of Standards New Zealand on 15 May 1998. It was published on 5 June 1998.

The following interests are represented on Committee WS/20:

Association of Consulting Engineers, Australia
Association of Hydraulic Services Consultants, Australia
Australasian Institute of Chartered Loss Adjusters
Australian Aluminium Council
Australian Chamber of Commerce and Industry
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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WS/20, Stormwater, to supersede AS 2180—1986, *Metal rainwater goods—Selection and installation*, and AS 3500.3—1990, *National Plumbing and Drainage Code,* Part 3: *Stormwater drainage*.

This Standard is part of a series, as follows:

AS 3500.3.1 Part 3.1: Stormwater drainage—Performance requirements

AS/NZS 3500.3.2 Part 3.2: Stormwater drainage—Acceptable solutions (this Standard)

Stormwater drainage—Methods for verification (Part 3.3) is in the course of preparation.

The objective of this Standard is to provide installers with acceptable solutions for materials and products and design and installation of stormwater drainage systems. These solutions are not intended to exclude the use of other solutions.

This edition sets out acceptable solutions for the following:

(a) Roof drainage systems:

  (i) A general method for design incorporating recent Australian research on the following:

    (A) *Eaves gutter systems*—procedures similar to those of AS 2180—1986 but with significant decreases in the ratios for the effective cross-sectional area of eave gutter to vertical downpipes.

    (B) *Box gutter systems*—procedures similar to those in AS 2180—1986 with additional procedures for sump/side overflow and sump/high-capacity overflow devices.

    (C) *Valley gutters*—procedures based on research published in 1988 by Martin and Tilley (see Paragraph A2).

  (ii) Installation, based on modifications and additions to AS 2180—1986.

(b) Surface drainage systems:

  (i) Nominal and general methods for design.

  (ii) Installation, based on modifications and additions to AS 3500.3—1990.

(c) Subsoil drainage systems design and installation, based on modifications and additions to AS 3500.3—1990.

The advantage of the roof drainage general method is the relative simplicity of its application. Continuing analysis of available experimental data is expected to result in new procedures for the design of—

(a) valley gutters; and

(b) eaves gutters with bends at various gradients for a wide range of cross-sections, sizes and depth to width ratios of 1:0.4 to 1:3.0.

Statements expressed in mandatory terms in notes to figures and tables are deemed to be requirements of 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.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE AND APPLICATION

1.1.1 Scope This Standard specifies acceptable solutions for materials and products, and design and installation of roof drainage systems, surface drainage systems and subsoil drainage systems to the point(s) of connection to the external stormwater drainage network.

1.1.2 Application This Standard will be referenced in the Building Code of Australia by way of BCA Amendment 3 to be published by 1 July 1998, thereby superseding the previous editions, AS 2180—1986 and AS 3500.3—1990, which will be withdrawn 12 months from the date of publication of this edition.

1.2 REFERENCED DOCUMENTS The documents referred to in this Standard are listed in Appendix A.

1.3 DEFINITIONS For the purpose of this Standard, and unless otherwise stated, the definitions referenced in the following Standards apply:

(a) For terms relating to Part 3, as given in AS/NZS 3500.0.

(b) For terms relating to buried flexible pipes, concrete pipes and vitrified clay pipes, as given in AS/NZS 2566.1, AS 3725 and AS 4060, respectively.

For other terms, the definitions below apply.

1.3.1 Average recurrence interval (ARI)—the expected or average interval between events of a rainfall intensity of a given magnitude being exceeded.

NOTE: The ARI is an average value based on statistical analysis. The actual time between exceedances will vary.

1.3.2 Box gutter—graded channel, generally of rectangular shape, for the conveyance of rainwater, located within the building. Includes a gutter adjacent to a wall or parapet. (See Figures I5, I7.)

1.3.3 Eaves gutter—channel, for the conveyance of rainwater, located along the eaves of a roof external to the fascia line. A concealed eaves gutter is located inside the fascia line and can also be called an internal eaves gutter.

1.3.4 External stormwater drainage network—a network that collects and conveys stormwater from individual properties.

NOTE: The network includes easement or inter-allotment drains, and street and trunk drainage systems.

1.3.5 Freeboard—the specified minimum vertical distance between the calculated and actual depths for a gutter, site stormwater channel or the like.

1.3.6 Inert catchment—a rainwater collection area whose dominant material has little or no effect on the chemical composition of rainwater draining from it. Such materials include acrylic, fibreglass, aluminium/zinc alloy-coated steel, glass, glazed tiles, unplasticized polyvinyl chloride and pre-painted metal.

1.3.7 Inlet pit—a chamber fitted with side, grate or combination entry to permit the collection and ingress of stormwater to a site stormwater drain (see Clauses 1.3.12, 1.3.18 and 1.3.24).

1.3.8 Main internal drain—a drain that collects stormwater from two or more site stormwater drains within a property and—

(a) has a diameter greater than DN 300; or

(b) drains stormwater from a roadway or accessway serving a number of buildings located on one property.

1.3.9 Major storm—a storm due to rainfall events of rare occurrence which can cause stormwater flows in excess of the capacity of the surface drainage system and hence overflows along overland flow paths.

NOTE: In Australia an ARI of 100 years (see the chapter on urban stormwater drainage in ARR87) and in New Zealand an ARI of 50 years, are commonly adopted for a major storm.

1.3.10 Minor storm—a storm due to rainfall events for which the surface drainage system is designed.

NOTE: The selected ARI for a minor storm will depend on the level of nuisance and damage likely to be caused by overflows due to rainfall events of a greater ARI, or failure of the surface drainage system or stormwater drainage network.

1.3.11 Network utility operator—the operator of the external stormwater drainage network.

1.3.12 On-grade pit—an inlet pit located on a slope where stormwater that is not readily admitted bypasses the inlet.

1.3.13 On-site stormwater detention (OSD) tank—a tank for the temporary storage of stormwater to reduce the peak flow to the stormwater drainage network.

1.3.14 Overflow device—a device for use with the roof drainage system to safely divert flow in the event of a blockage.

1.3.15 Permanent ponding—occurs along the sole of eaves and box gutters when free water is evident for more than three days after the cessation of flow.

1.3.16 Point of connection—the point provided for the connection of a site stormwater drain to the stormwater drainage network.

NOTE: Where a property is more than 90 m from an external stormwater drainage network, the network utility operator may permit an alternative point of connection.

1.3.17 Rainhead—a collector of rainwater, generally of rectangular shape, at the end of a box gutter and external to a building, connected to an external downpipe (see Figure I2). It has a similar function to a sump (see Clause 1.3.26).

1.3.18 Sag pit—an inlet pit located in a depression where stormwater ponds over the inlet due to restricted entry.

1.3.19 Site stormwater drain or channel—a conduit, generally buried, or an artificial open channel for the conveyance of stormwater to the point of connection to the external stormwater drainage network or to a main internal drain.

1.3.20 Soaker—a purpose made channel or flashing located along the intersection of a roof with the upper edge of a chimney or similar roof penetration.

1.3.21 Spreader—a device fitted to the foot of a downpipe to evenly distribute rainwater onto a roof at a lower level. It is generally used where it is undesirable for practical or aesthetic reasons to connect the high level roof downpipe directly to the storm water drainage system.

1.3.22 Stormwater—the run-off due to rainfall on and upstream of the property.

1.3.23 Stormwater drainage system—comprises the roof drainage system, surface drainage system and subsoil drainage system on a property, used for the collection and conveyance of stormwater from such property to the point of connection to the external drainage network.

1.3.24 Stormwater pit—a chamber located on a site stormwater drain to allow the ingress of stormwater, changes in direction and to facilitate inspecting, testing and clearance of obstructions.

1.3.25 Subsoil drain—a buried conduit for the collection and conveyance of subsurface and ground water.

1.3.26 Sump—a collector of rainwater, generally of rectangular shape, in the sole of a box gutter and connected to a downpipe within the building perimeter. Its function is to increase the head of water at the entry to the downpipe and thus increase the capacity of the downpipe. See Figures I5 and I7.

1.3.27 Surcharge outlet—an inlet pit or riser, that extends above the finished surface level and is fitted with a loose domed grate, located on a site stormwater drain to allow the egress of stormwater due to the surcharge of such drain.

1.3.28 Surface drainage system—a system for the collection and conveyance of stormwater, the elements of which include kerbs and gutters, site stormwater drains or channels and appurtenances and pumped systems.

1.3.29 Valley gutters—inclined channels placed at the intersecting sloping surfaces of the adjacent roof for the conveyance of rainwater.

1.4 NOTATION

1.4.1 Quantity symbols Quantity symbols used in this Standard are listed below.

Quantity symbol		*Definition*	*Unit*
A	=	cross-sectional area of flow in an open channel	m^2
A_c	=	catchment area of a roof and vertical surface (wall or parapet)	m^2
A_{cdp}	=	for a selected eaves gutter, the maximum catchment area of roof per vertical downpipe (See Appendix H)	m^2
$A_{s\text{-}c}$	=	Eaves gutter subcatchment area for a particular downpipe and high point layout	m^2
A_e	=	effective cross-sectional area of a gutter	mm^2
A_h	=	plan area of a roof including the gutter or parapet which is part of the catchment	m^2
A_{hdp}	=	for a selected eaves gutter, the maximum plan area of roof per downpipe	m^2