NCC

Understanding the NCC

Gutter and downpipe provisions for housing

The Performance Requirements of the National Construction Code (NCC) can be met by either using a Performance Solution, a Deemed-to-Satisfy (DTS) Solution, or a combination of both.

The following is a general representation of the selection and installation of gutters and downpipes, including overflow measures from the ABCB Housing Provisions. The Housing Provisions cover Class 1 and 10 buildings and may be used to meet the DTS Provisions.

This information is useful for building designers, hydraulic consultants, plumbers, builders and other on-site trades. It is based on the national provisions of the NCC and does not address any state and territory variations. These variations and additions are located in the NCC. The NCC is available at ncc.abcb.gov.au. A gutter, downpipe and overflow (GDO) calculator is also available from the ABCB resource library.

The requirement to install drainage systems from roofs and sub-soil drains should be confirmed with the appropriate authority. These provisions may be applied when roof drainage is connected to a stormwater system. The provisions may no longer be used for box gutters.

Eave gutters
Housing Provisions Part 7.4

An eave gutter is a gutter fixed to a fascia (or an eave) to catch rainwater running off a roof and forms part of a roof drainage system. An eave gutter must be supported by suitably fixed brackets at the stop ends and spaced at not more than 1.2 m along the entire length of the gutter. Eave gutters must have a minimum fall of 1:500 (unless fixed to a metal fascia).

The minimum size required for an eave gutter is dependent on a number of factors. First, you need to consider the location of the building. Different locations have different rainfall intensities that the roof drainage system must be designed to cope with. For selection of eave gutters, a rainfall intensity of 5 minute duration and annual exceedance probability of 5% is used, which is expressed as millimetres per hour (mm/h). Rainfall intensities for different locations are shown in Table 7.4.3d of the Housing Provisions.

Version: 2022.3
October 2023

Example: 5 minute duration rainfall intensity

Table 7.4.3d in the Housing Provisions shows Mackay (Qld) has a 5 minute duration rainfall intensity of 250 mm/h for a rainfall event with an annual exceedance probability of 5%. For Albury in NSW, it is 139 mm/h.

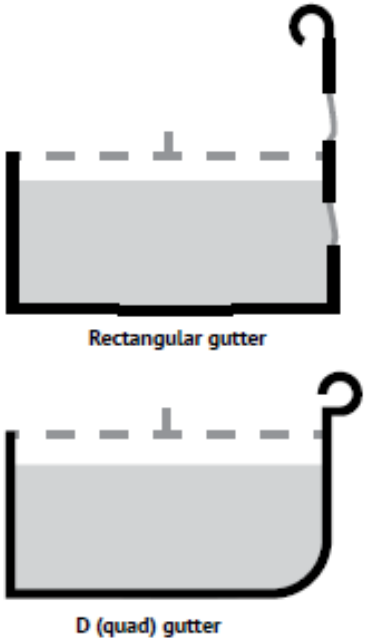
When rainfall intensity is identified, the catchment area of the roof (that is to flow into the gutter) must be determined. Typically this is done by multiplying the length of the eave gutter by the distance between the ridge and the eave gutter. For example, if the gutter is 3 metres long and the distance from the gutter to the ridge is 3 metres, then the catchment area of the roof is 9 square metres (3 m x 3 m = 9 m^2).

Once the rainfall intensity and roof catchment area are known, the appropriate type/size of eave gutter is selected using Table 7.4.3a in the Housing Provisions.

The Housing Provisions cover 2 eave gutter types:

- rectangular gutters
- D (quad) gutters.

Figure 1 Gutter types



These gutters are then broken down into 6 gutter types (based on their size and shape), labelled A through to F as specified in Table 7.4.3b of the Housing Provisions. They are:

Gutter type A is a medium rectangular gutter with a minimum cross sectional area of 6,500 mm².

Gutter type B is a large rectangular gutter with a minimum cross sectional area of 7,900 mm².

Gutter type C is a 115 mm D gutter with a minimum cross sectional area of 5,200 mm².

Gutter type D is a 125 mm D gutter with a minimum cross sectional area of 6,300 mm².

Did you know?

Valley gutters on a roof with a pitch less than 12.5 degrees cannot utilise the Housing Provisions and must be designed in accordance with AS/NZS 3500 or a Performance Solution be developed.

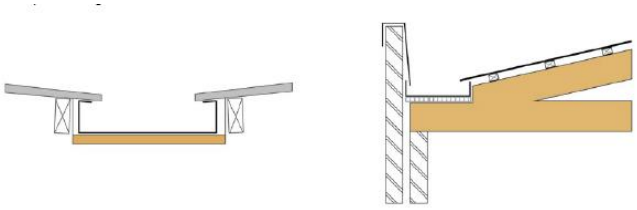
Gutter type E is a 150 mm D gutter with a minimum cross sectional area of 9,000 mm².

Gutter type F must be designed in accordance with the joint Australian and New Zealand Standard AS/NZS 3500.3 Plumbing and drainage - Stormwater drainage. These gutters are no longer covered by the Housing Provisions.

Box gutters

The Housing Provisions no longer provide requirements for box gutters. Instead, a box gutter must be designed and installed in accordance with AS/NZS 3500.3 or a Performance Solution be developed. Examples of box gutters are shown in Figure 2.

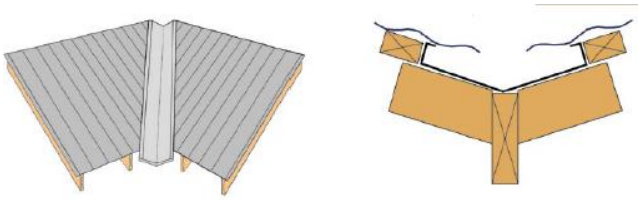
Figure 2 Examples of box gutters



Valley gutters Housing Provisions Part 7.4

A valley gutter is an exposed open gutter located in the valley of a roof. Valley gutters on a roof must be provided with a pitch more than 12.5 degrees, a minimum freeboard of not less than 15 mm and a side angle of not less than 12.5 degrees. They are also required to have dimensions as set out in Table 7.4.4c of the Housing Provisions for the relevant rainfall intensity. Examples of valley gutters are shown in Figure 3.

Figure 3: Examples of valley gutters



Example: Gutter selection

Table 7.4.3a of the Housing Provisions shows 30 m² of roof catchment area (which flows into one downpipe) in a location with a design rainfall intensity of 255 mm/h, requires a minimum of A or C type gutter.

Downpipes Housing Provisions Part 7.4

A downpipe is a pipe carrying rainwater from a gutter to a sub-surface drainage system or ground level. They are part of a roof drainage system. One downpipe must

serve no more than a 12 m length of gutter and must be located as close as possible to valley gutters. The Housing Provisions cover 4 downpipe types as per Table 7.4.3c. They are:

- 75 mm diameter (round)
- 90 mm diameter (round)
- 100 mm x 50 mm (rectangular)
- 100 mm x 75 mm (rectangular).

All of these types of downpipes can be used with all eave gutter types, except for 75 mm diameter (round) downpipes which are not suitable for use with Type E 150 mm D gutters.

Materials Housing Provisions Part 7.4

The materials used in gutters, downpipes, and flashings need to ensure:

- that no lead is used if forming part of a drinking water catchment area; and
- that materials are compatible with upstream roofing materials.

Overflow designs Housing Provisions Part 7.4

Allowing for rainwater overflow is critical in gutter design to minimise the risk of damage to buildings or loss of amenity for occupants. The NCC requires overflow measures capable of coping with a 5 minute duration rainfall intensity and an annual exceedance probability of 1%. The capacity of the selected overflow measures must exceed the overflow volume. These overflow measures can be continuous or dedicated measures.

An overview of each of these measures is as follows:

- **Continuous overflow measures** run along a length of gutter, for example, slots at regular intervals along the front face of a gutter. These are discussed further below.
- **Dedicated overflow measures** are specific points where rainwater overflow can occur, for example, a rainhead.

  These measures can be used separately, or in combination to achieve the required overflow volumes. These are discussed further below.

Did you know?

Overflow measures are not required for an eave gutter fixed to:

- a verandah; or
- an eave that is greater than 450 mm in width, which—
  - has no lining; or

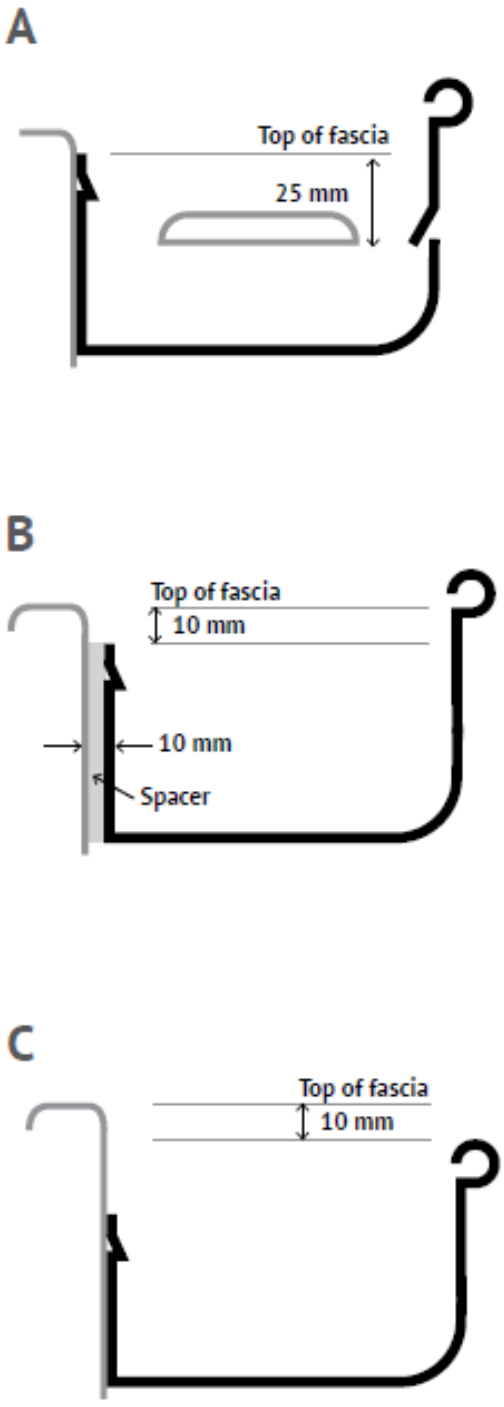
is a raked eave (with a lining that falls away from the building).

Continuous overflow measures -The overflow volume for continuous measure (L/s/m) is obtained from Table 7.4.4a which cross references the design 5 minute duration rainfall intensity with the distance from the ridge to the gutter.

Once the required overflow volume is known, the appropriate overflow measure is selected. Part 7.4 provides 3 examples, see Figure 4.

- **Front face slotted gutter (A)** provides 0.5 L/s/m of overflow if it has a minimum slot opening area of 1200 mm^2 per metre of gutter with the lower edge of the slots installed 25 mm below the top of the fascia.
- **Controlled back gap (B)** provides 1.5 L/s/m of overflow if it has a 10 mm (or greater) spacer permanently installed between the back of the gutter and the fascia. The spacer must be installed at every bracket (and be no more than 50 mm wide). The back of the gutter must be installed a minimum of 10 mm below the top of the fascia.
- **Controlled front bead height (C)** provides 1.5 L/s/m of overflow if it has the front of the gutter installed a minimum of 10 mm below the top of the fascia.

Figure 4 Examples of continuous overflow measures



Dedicated overflow measures The overflow volume for dedicated measure (L/s/m) is obtained from Table 7.4.4b which cross references the design 5 minute duration rainfall intensity with the roof catchment area.

Once the required overflow volume capacity is known, the appropriate overflow measure is selected. Part 7.4 of the Housing Provisions provides 4 examples, see Figure 5.

- An **end stop weir (D)** provides 0.5 L/s of overflow if it has a minimum clear width of 100 mm and is installed a minimum of 25 mm below the top of the fascia.
- An **inverted nozzle (E)** provides 1.2 L/s of overflow if it is installed within 500 mm of the gutter high point with a minimum nozzle size of 100 mm x 50 mm (positioned lengthways in the gutter). The top of the nozzle must be a minimum of 25 mm below the top of the fascia.
- A **front face weir (F)** provides 1.0 L/s of overflow if it has a minimum clear width of 200 mm with a minimum height of 20 mm. The weir edge must be installed 25 mm below the top of the fascia.
- A **rainhead (G)** provides 3.5 L/s of overflow if it has a 75mm diameter hole in its outer face with the centre line of the hole positioned 100 mm below the top of the fascia.Figure 5 Examples of dedicated overflow measures