



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 of NCC Volume Two. The Housing Provisions cover Class 1 and 10 buildings.

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](http://ncc.abcb.gov.au)<sup>1</sup>

The requirement to install drainage systems from roofs and sub-soil drains should be confirmed with the appropriate authority. These provisions need only be applied when drainage systems are necessary.

<sup>1</sup> A gutter, downpipe and overflow (GDO) calculator is also available from the [ABCB resource library](#).

## 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 Tables 7.4.3d to 7.4.3k of the Housing Provisions.



### Example: 5 minute duration rainfall intensity

Table 7.4.3g 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 (Table 7.4.3e).

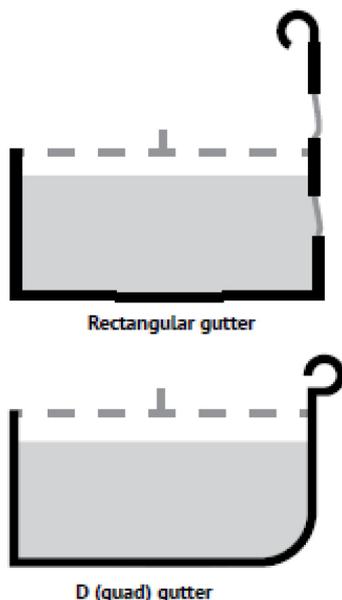
Once a rainfall intensity is identified, the catchment area of the roof (that is to flow into the gutter) must be determined. Typically this is done by multiplying the length of the eave gutter by the distance between the ridge and the eave gutter. For example, if the gutter is 3 metres long and the 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<sup>2</sup>).

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



### Gutter types

(as per Table 7.4.3b of the Housing Provisions)

**Gutter type A** is a medium rectangular gutter with a minimum cross sectional area of 6,500 mm<sup>2</sup>.

**Gutter type B** is a large rectangular gutter with a minimum cross sectional area of 7,900 mm<sup>2</sup>.

**Gutter type C** is a 115 mm D gutter with a minimum cross sectional area of 5,200 mm<sup>2</sup>.

**Gutter type D** is a 125 mm D gutter with a minimum cross sectional area of 6,300 mm<sup>2</sup>.

**Gutter type E** is a 150 mm D gutter with a minimum cross sectional area of 9,000 mm<sup>2</sup>.

**Gutter type F** must be designed in accordance with the joint Australian and New Zealand Standard AS/NZS 3500.3.

### Example: Gutter selection

Table 7.4.3.a of the Housing Provisions shows that the 30 square metres 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.

## Box gutters Housing Provisions Part 7.4

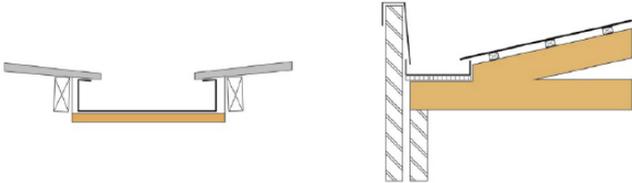
A box gutter is typically a gutter set into the roof. Because a box gutter is usually located above a room or space in a building, there is an increased risk that rainwater overflow could cause damage to the building, or cause loss of amenity to its occupants.

Because of this, box gutters must be able to cope with a 5 minute duration rainfall intensity and an annual exceedance probability of 1%, rather than 5% as is the case for eave gutters.

A box gutter must be installed with a fall not less than 1:100 and be designed in accordance with AS/NZS 3500.3.

Examples of box gutters are shown in Figure 2.

Figure 2 Examples of box gutters

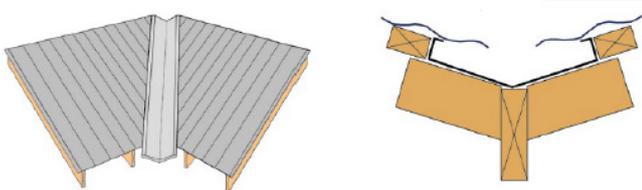


### Valley gutters Housing Provisions Part 7.4

A valley gutter is an exposed open gutter located in the valley of a roof. Valley gutters on a roof with a pitch more than 12.5 degrees must have a width of at least 400 mm with at least 150 mm of the roof covering overhanging past each side of the gutter.

Examples of valley gutters are shown in Figure 3.

Figure 3: Examples of valley gutters



#### Did you know?

A valley gutter on a roof with a pitch of less than 12.5 degrees must be a box 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. 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.

### 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%. These overflow measures can be continuous or dedicated measures.

**Continuous overflow measures** run along a length of gutter, for example, slots at regular intervals along the front face of a gutter.

**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 capacity.

#### Did you know?

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

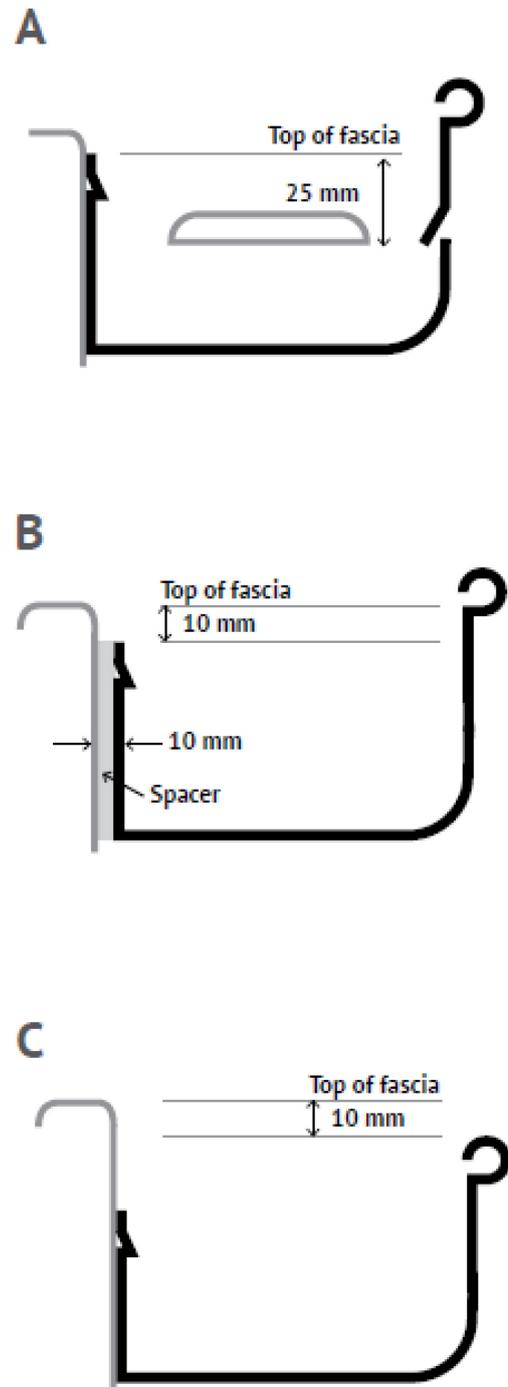
- a verandah; or
- an eave that is greater than 450 mm in width, which—
  - has no lining; or
  - is a raked eave (with a lining that falls away from the building).

**Continuous overflow measures** are based on the distance from the ridge to gutter (in metres). This is then cross referenced with the 5 minute duration rainfall intensity appropriate to the location (see Tables 7.4.3d to 7.4.3k in the Housing Provisions) to enable the overflow capacity required to be determined in litres per second per metre of gutter (L/s/m).

Once the required overflow capacity is known, the appropriate overflow measure is selected. For example, a front face slotted gutter provides 0.5 L/s/m of overflow. In other words, 1 metre of slotted gutter will have the capacity to allow 0.5 litres per second of rainwater to overflow. Therefore, 5 metres of slotted gutter will provide 2.5 litres of overflow every second. Some examples of continuous overflow measures are provided, these being.

- **Front face slotted gutter (A)** provides 0.5 L/s/m of overflow. It must have a minimum slot opening area of 1200 mm<sup>2</sup> 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. It must have 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. It must have 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** are based on the roof catchment area (in square metres). This is then cross referenced with the 5 minute duration rainfall intensity for a specific location (see Table 7.4.4b in the Housing Provisions) to enable the overflow capacity required to be determined in litres per second.

For example, one end stop weir will allow 0.5 litres of rainwater to overflow every second. Some examples of dedicated overflow measures are provided below.

- An **end stop weir (D)** provides 0.5 L/s of overflow. It must have a minimum clear width of 100 mm and be installed a minimum of 25 mm below the top of the fascia.
- An **inverted nozzle (E)** provides 1.2 L/s of overflow. It must be 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. It must have 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. It must have a 75mm diameter hole in its outer face with the centre line of the hole positioned 100 mm below the top of the fascia.

