# What size of Marley spouting and downpipes do I need?

## Whether it is a new build or existing property, the safe disposal of rainfall via an effective rainwater system aims to avoid the likelihood of damage or nuisance to both the property and its neighbours.

BRANZ Bulletin 509 Section 2.1.4 states that "This is normally achieved in urban areas by collecting rainwater from the roof using spouting and downpipes connected to a surface water drain. This is then connected to a disposal system owned and operated by a network utility operator."

However regions across New Zealand are subjected to varying levels of rainfall intensity which in turn affects the capacity required from spouting and the appropriate no of downpipes. The New Zealand Building Code requires that when designing a rainwater system you allow for a level of rainfall intensity that has a 10% chance of occurring once a year for 10 minutes. Exact rainfall intensities across NZ can be checked using the NIWA High Intensity Rainfall Design System – https://hirds.niwa.co.nz ; however for most areas in New Zealand 100mm/hr is a suitable rule of thumb.

The size and slope of the roof area also affects the required capacity with larger roofs capturing more rainwater and steeper pitches increasing the speed with which the rainwater drains into the spouting and downpipe system.

Note: This document is based on BRANZ Bulletin BU509 Sizing gutters and downpipes. For the original document please go to branz.co.nz

### SELECTING THE RIGHT SPOUTING

The spouting's key responsibility is to collect rainwater from the roof and safely transport the water to the outlets without overflowing.

The actual volume of water or 'flow capacity' (litres per min) to be collected for any given roof and location can be calculated by multiplying the roof area by the 'flow load factor' – different flow load factors are shown in Table 1 for common rainfall intensities (excerpt from BRANZ Bulletin 509).

Once you know the required flow capacity you can work out the minimum spouting capacity or cross sectional area required and use this to select the right spouting.

It's important to note that your calculations should always be based on the size of the largest section of roof. This ensures the spouting will have sufficient capacity for all other smaller roof sections on the building.

**Table 1 – Flow load factors for given rainfall intensities**

| RAINFALL INTENSITY (MM/HOUR) | FLOW LOAD FACTOR L/M |
|---|---|
| 50 | 0.83 |
| 75 | 1.25 |
| 100 | 1.67 |
| 125 | 2.08 |
| 150 | 2.50 |
| 175 | 2.92 |
| 200 | 3.33 |

### EXAMPLE 1: A 50m² roof area in a location with a rainfall intensity of 100mm/hr.

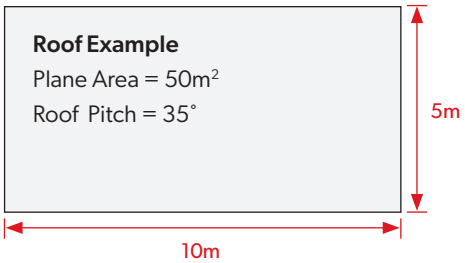
Flow Capacity = Roof Area x Flow Load Factor

**Flow Capacity = 50 x 1.67 = 83.5l/min**

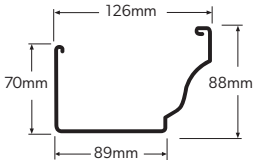
So the spouting and downpipe system has to be able to handle 83.5 litres of water per minute

Minimum Spouting Area in $mm^2$ = (FC/0.0016)0.8

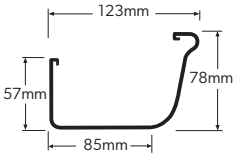
**Min Spouting Area = $(83.5/0.0016)^{0.8}$ = 5943.65$mm^2$**



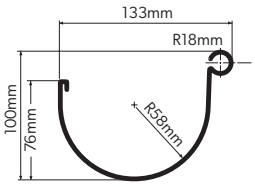
## So which of the following Marley spouting profiles would be suitable?



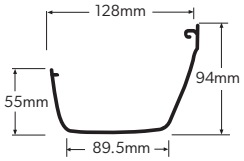

**Classic**
Cross sectional area
6700mm²



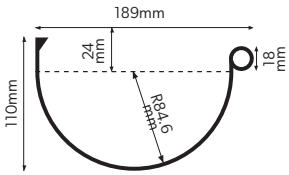

**Stormcloud®**
Cross sectional area
5100mm²




**Typhoon®**
Cross sectional area
6100mm²




**FL2®**
Cross sectional area
4800mm²




**Magnum®**
Cross sectional area
14300mm²

**Answer:** Classic, Typhoon and Magnum

**However…** the position of outlets affects the minimum spouting capacity. For example, a centrally located outlet halves the serviced roof area (example shown in Figure 3 from BRANZ Bulletin 509)

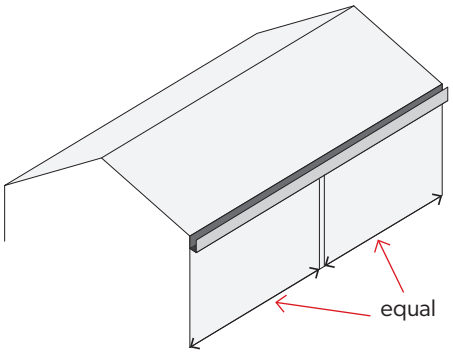
So based on this we could revise our example as follows:

**Total Roof Area = 50m²**

**Serviced Roof Area = 25m²**

**Flow Capacity = 25 x 1.67 = 41.75l/min**

**Min Spouting Area = $(41.75/0.0016)^{0.8}$ = 3413.73mm²**




With a centrally located outlet all Marley spouting profiles could be used.

## How many downpipes and what size?

The downpipes are sized to suit the roof area as well as the roof pitch so that they are able to handle both the volume of rainwater and the speed.

Again using our original example and Table 2 (BRANZ Bulletin 509)

**Roof Area = 50m2**

**Roof Pitch = 35˚**

**Therefore options include:**

1 x Marley RP80® 80mm Round Downpipe

1 x Marley 100x50mm Rectangular Downpipe

2 x Marley RP65® 65mm Round Downpipes

2 x Marley 65x50mm Rectangular Downpipe

**Table 2 – Downpipe sizes for given roof pitch and roof plane area**

| DOWNPIPE SIZE (MM) (1) | ROOF PITCH | | | |
|---|---|---|---|---|
| Minimum internal size | 0 - 25˚ | 25˚ - 35˚ | 35˚ - 45˚ | 45˚ - 55˚ |
| | Roof plane area served by the downpipe (m²) | | | |
| 63mm diameter | 60 | 50 | 40 | 35 |
| 74mm diameter | 85 | 70 | 60 | 50 |
| 100mm diameter | 155 | 130 | 110 | 90 |
| 150mm diameter | 350 | 290 | 250 | 200 |
| 65 x 50 rectangular | 60 | 50 | 40 | 35 |
| 100 x 50 rectangular | 100 | 80 | 70 | 60 |
| 75 x 75 rectangular | 110 | 90 | 80 | 65 |
| 100 x 75 rectangular | 150 | 120 | 105 | 90 |

Note (1) This table increases the conservatism of the design by incorporating the slope factor and therefore the run-off rate when roof plane area is used.

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