# RAINWATER DISPOSAL SYSTEM PERFORMANCE STATEMENT

## (a) Description

Dimond rainwater disposal systems are available in a variety of materials together with the appropriate brackets and downpipes. Table 3.1A below summarises the gutter material options available.

### Table 3.1A

| Material | Grade | Thickness mm | Metal Coating | Prepaint Finish Available | Relevant Standard |
|---|---|---|---|---|---|
| Steel | G 250/300 | 0.55 BMT | Zinc/Aluminium/ Magnesium | Yes | AS 1397 |
| Aluminium (plain) | 5052<br>5251 | 0.9 BMT | N/A | Yes | AS 1734 |
| Stainless Steel | 445M2/304 | 0.55 | N/A | No | AS1449 |
| Copper | 122A | 0.55 | N/A | No | AS2738 |

## (b) Scope of Use

Dimond Rainwater Disposal Systems are intended to collect and channel water that runs off a roof. It is intended that the metal gutters be placed at the perimeter of the building, and not in an internal situation. Use of the products is subject to the limitations listed below.

## (c) Requirements

Attention to the following details is required to ensure the expected system performance is achieved.

- The selection of the type and grade of gutter and bracket material and fasteners must be based on the life expectancy required and the severity of the external and internal environments. Refer Sections 2.1.1.2, 2.1.1.3, 2.1.1.4, 2.2.3.
- Site storage that keeps the product dry and protected from damage.
- Product handling that prevents surface damage.
- Correct installation of the brackets and gutter and snow straps.
- Allowance for thermal expansion and contraction.
- Sufficient fall to permit complete surface water drainage, allowing the gutter to completely dry out and not hold water.
- Control of allowable contact with dissimilar materials. Refer Section 2.1.3.3.
- Awareness and implementation of maintenance requirements, particularly for surfaces not washed by natural rainfall. Refer Section 2.1.1.3.

## (d) NZBC Compliance

Test information available from Pacific Coilcoaters and BHP NZ Steel, and past history of rainwater products, indicate that provided the product use and maintenance is in line with the guidelines contained in the current literature referenced, Dimond Rainwater Disposal Systems can be expected to meet the performance criteria in Clause E2 of the New Zealand Building Code, for a period of not less than 5 years.

## (e) Use Outside the Stated Guidelines

If the need arises to use Dimond Rainwater Disposal Systems outside the limitations and procedures given in this or other referenced literature, or, if any doubt exists on product handling or use, written approval for use must be obtained from Dimond, before the project commences.

# DURABILITY, WARRANTY, MAINTENANCE



## DURABILITY

Reference should be made to Section 2.1.1.2 Environments, to ensure the correct material for the environment is chosen. Coated brackets should be considered for use in severe and very severe marine environments. In snowfall areas refere to section 3.1.4.7.



## WARRANTY

Warranties for commercial applications are issued on a job by job basis. It is imperative that care is taken during the planning process to choose the Dimond rainwater disposal system that will provide the life expectancy in the environment in which it will be installed, as incorrect selection could result in no warranty being available.

To assist you in determining the system that will best meet your warranty expectations Dimond have in place a Warranty Inquiry Service. Your design decisions on product type, paint coating type and colour, along with site details including address, distance from sea and degree of exposure will be required to enable us to provide a meaningful warranty. To access the service, please contact your Dimond Key Account person or phone 0800 DIMOND.

All warranties will carry a required maintenance clause, which must be complied with to ensure the warranty remains valid. Often aspects of design such as roof shape and roof pitch can influence the maintenance requirements. Due consideration of these factors during the design process is wise.

As a general guide, provided the materials are correctly selected from Section 2.1.1.2, Table 2.1B, and provided the building design does not impact on durability, it is reasonable to expect the following warranty terms will be available to your rainwater disposal system.

Steel and aluminium based materials

10 years to perforation of substrate.

5 years resistance to flaking, peeling and excessive fade.



## MAINTENANCE

Dimond rainwater disposal systems require at least the following maintenance as a minimum to ensure the guaranteed performance is achieved. Additional regular maintenance can extend the useful life of the products. We define “regular” as often as is needed to avoid dirt build up on the gutter surface.

1. Keep surfaces clean and free from continuous contact with moisture and debris. The use of a proprietary leaf build-up protection system does not remove the need for regular gutter cleaning to remove any accumulated dirt and debris build-up on the roof or gutter.
2. Ensure that areas that are not washed by rainfall are cleaned regularly with water spray and/or if necessary by scrubbing with a soft nylon brush. This includes the foot of the internal brackets.
3. At the first sign of corrosion, the affected areas should be cleaned down, spot primed and then repainted to an appropriate paint manufacturer’s recommendations.
4. Some fading of the surface coating will occur over time, making repainting necessary to retain aesthetic value.

# INSTALLER PROGRAMME

Dimond rainwater disposal systems must be correctly selected, specified and installed if they are to meet their designed performance.

Correct system selection and specification will be achieved by following the design guidelines in this manual.

Correct system installation (including components used and workmanship) will be achieved by specifying the use of a Dimond recommended installer.

Correct system performance will be endorsed by requesting a Dimond inspection and written report on completed work that has been carried out by a Dimond recommended installer.

# AREAS TO CHECK ON SITE

## Gutters

- Materials compatible with environment and roofing material used
- Laps sealed and correctly fastened
- Sufficient fall provided to avoid ponding
- Thermal expansion accommodated where necessary
- Secondary means of water discharge to eliminate water overflow from gutter entering the building

## Brackets

- Correct type and size to suit the gutter chosen
- Snow straps installed if in Snowfall Region

## Fasteners

- Correct type and size to suit bracket and environment
- Fixings to resist wind uplift of gutter

## Droppers and Downpipes

- Droppers to be positioned at lowest point of gutter run
- Correct downpipe size and placement to handle flow load of roof and gutter chosen

# RAINWATER DISPOSAL SYSTEMS DESIGN

## (a) Thermal Movement

For guidance on expansion rate of the various materials please refer to Section 2.1.3.4.

Where long runs of gutter unbroken by change of direction are planned, it is recommended that steel gutters should not exceed 18 metres and aluminium and copper gutters 12 metres, without the provision of thermal expansion joints to prevent distortion.

The most practical way to accommodate movement is through the use of rainheads which will allow the gutter to move freely at the discharge end. If downpipes are fitted directly to the sole of the gutter, saddle flashings will be required at the high points to accommodate separation of the gutter runs.

## (b) Flow Capacity

A quick reference for catchment area per downpipe is available for the standard Dimond gutters – refer Section 3.1.4.1 to 3.1.4.7.

To confirm the suitability of a non-standard gutter to handle the expected rainfall it is necessary to determine the flow load likely from the roof, and the flow capacity of the anticipated gutter shape.

To determine flow load from roof:

| | | |
|---|---|---|
| Design flow load (litres/minute) | Q | $= 1.67 \times A_C \times \frac{I}{100}$ |
| Where | $A_C$ | = catchment area ($m^2$) (this includes $^1/_2$ the area of any vertical surface or the total area of any other roof that drains on to the catchment area) |
| | I | = Expected rainfall intensity for the geographical location (see Table 3.1B) (mm/hr) |

To determine flow capacity of the gutter chosen:

| | | |
|---|---|---|
| Flow capacity (litres/minute) | $Q_C$ | $= .0016 \times A_e^{1.25}$ |
| Where | $A_e$ | = Effective cross sectional area of the gutter ($mm^2$) |

These formulae are incorporated in Table 3.1C for use in the following design process.

The above formulae and Table 3.1C are for design of external gutters based on falls of at least 1:500 or greater. These formulae can be used for internal box gutters provided Q is factored down by

0.4 for no fall

0.5 for 1:500 fall

0.6 for 1:200 fall

This method then aligns itself with AS/NZS 3500 Part 3.

## Design Process for Eaves Gutters

Where eaves gutters other than the standard Dimond range shown in Section 3.1.4.1 to 3.1.4.6 are preferred, you will need to confirm the performance of the gutter shape in relation to the location it will be used in, e.g. the area of roof the gutter shape can drain per downpipe. The following is a step by step guide to confirming the suitability of the gutter chosen.

1. Place downpipes at the preferred locations around the structure. No run of gutter from high point to outlet should exceed 18m. Downpipes should be placed with 2m of valley's discharging into the gutter. It is good practice to position the downpipe within 2m of internal or external corners.
2. Calculate the roof catchment area $A_C$ ($m^2$) for each downpipe. Divide the roof into sections, each section served with a length of gutter sloping from a high point to the outlet. Each section or gutter length is multiplied by the rafter length. If any vertical surface can drain onto the catchment area, add half the vertical surface area to the roof area you are calculating. Also add the total area of any upper roof discharging on to a lower roof.
3. Establish the rainfall intensity for the geographical location of the structure. The New Zealand Building Code Approved Document E1 Surface Water has determined two levels of rainfall intensity. Where an overflowing gutter can result in water entering a building, the rainfall intensity shall be based on a storm with a 2% probability of occurring annually (a 1 in 50 year storm). Otherwise the intensity shall be based on a storm with a 10% probability of occurring annually (a 1 in 10 year storm).

Table 3.1B shows the average intensity for some of the metropolitan centres in New Zealand. For a more precise value contact should be made with the Plumbing and Drainage section of the relevant Territorial Authority.

### Table 3.1B

| Rainfall Intensity I (mm/hr) | | |
|---|---|---|
| | 10 year period | 50 year period |
| Kaitaia | 110 | 150 |
| Keri Keri | 115 | 155 |
| Whangarei | 140 | 180 |
| Auckland | 110 | 150 |
| Hamilton | 105 | 160 |
| Tauranga | 140 | 200 |
| Rotorua | 145 | 190 |
| New Plymouth | 110 | 175 |
| Napier/ Hastings | 75 | 125 |
| Palmerston North | 80 | 125 |
| Wellington | 70 | 100 |
| Nelson | 95 | 145 |
| Blenheim | 55 | 75 |
| Christchurch | 60 | 90 |
| Timaru | 55 | 90 |
| Tekapo | 50 | 75 |
| Dunedin | 70 | 100 |
| Greymouth | 105 | 145 |
| Gore | 65 | 110 |
| Invercargil | 60 | 100 |

The intensity is based on a 10 minute duration extrapolated to determine the theoretical amount over 1 hour.

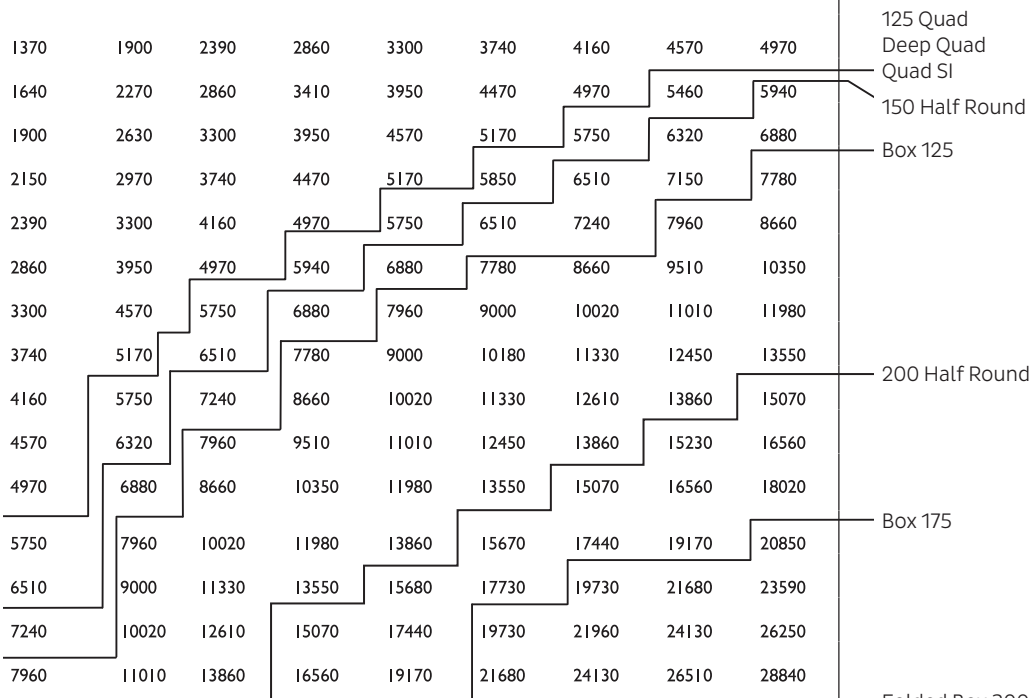
Figures derived from statistical data supplied by NIWA 2018.

4. Enter Table 3.1C on the catchment area line and extend across to the rain intensity column. This will provide the effective cross sectional area your proposed gutter will need to have. Interpolate between columns if necessary.

5. The flow capacity limit for each of the standard Dimond gutters is indicated in Table 3.1C by a stepped line. Select the appropriate Dimond gutter and refer to Sections 3.1.4.1 to 3.1.4.9 from the detailed design information.

## Table 3.1C Effective Cross Section of Gutter $A_e$ (mm²)

| Catchment Area Per Downpipe $A_c$ (m²) | Rainfall Intensity I (mm/hr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 |
| 20 | 1370 | 1900 | 2390 | 2860 | 3300 | 3740 | 4160 | 4570 | 4970 |
| 25 | 1640 | 2270 | 2860 | 3410 | 3950 | 4470 | 4970 | 5460 | 5940 |
| 30 | 1900 | 2630 | 3300 | 3950 | 4570 | 5170 | 5750 | 6320 | 6880 |
| 35 | 2150 | 2970 | 3740 | 4470 | 5170 | 5850 | 6510 | 7150 | 7780 |
| 40 | 2390 | 3300 | 4160 | 4970 | 5750 | 6510 | 7240 | 7960 | 8660 |
| 50 | 2860 | 3950 | 4970 | 5940 | 6880 | 7780 | 8660 | 9510 | 10350 |
| 60 | 3300 | 4570 | 5750 | 6880 | 7960 | 9000 | 10020 | 11010 | 11980 |
| 70 | 3740 | 5170 | 6510 | 7780 | 9000 | 10180 | 11330 | 12450 | 13550 |
| 80 | 4160 | 5750 | 7240 | 8660 | 10020 | 11330 | 12610 | 13860 | 15070 |
| 90 | 4570 | 6320 | 7960 | 9510 | 11010 | 12450 | 13860 | 15230 | 16560 |
| 100 | 4970 | 6880 | 8660 | 10350 | 11980 | 13550 | 15070 | 16560 | 18020 |
| 120 | 5750 | 7960 | 10020 | 11980 | 13860 | 15670 | 17440 | 19170 | 20850 |
| 140 | 6510 | 9000 | 11330 | 13550 | 15680 | 17730 | 19730 | 21680 | 23590 |
| 160 | 7240 | 10020 | 12610 | 15070 | 17440 | 19730 | 21960 | 24130 | 26250 |
| 180 | 7960 | 11010 | 13860 | 16560 | 19170 | 21680 | 24130 | 26510 | 28840 |
| 200 | 8660 | 11980 | 15070 | 18020 | 20850 | 23590 | 26250 | 28840 | 31380 |
| 250 | 10350 | 14320 | 18020 | 21540 | 24930 | 28200 | 31380 | 34480 | 37510 |
| 300 | 11980 | 16560 | 20850 | 24930 | 28840 | 32630 | 36300 | 39890 | 43400 |
| 350 | 13550 | 18740 | 23590 | 28200 | 32630 | 36910 | 41070 | 45130 | 49100 |
| 400 | 15070 | 20850 | 26250 | 31380 | 36300 | 41070 | 45700 | 50210 | 54630 |
| 500 | 18020 | 24930 | 31380 | 37510 | 43400 | 49100 | 54630 | 60030 | |
| 600 | 20850 | 28840 | 36300 | 43400 | 50210 | 56800 | 63210 | | |
| 700 | 23590 | 32630 | 41070 | 49100 | 56800 | 64260 | | | |



6. If a custom made shape is required, choose your shape and set the dimensions to achieve the effective cross sectional area ($A_e$) of the gutter required by Table 3.1C using the following formula:

| | | |
|---|---|---|
| Effective cross sectional area ($A_e$) | | = 0.9 x W x D |
| Where | W | = the average width measured at half the depth (mm) |
| | D | = depth (mm) |

Once D is established to achieve $A_e$, it is recommended a free board allowance of at least 10mm is added.
Be sure to determine that it is possible to manufacture the gutter shape that you choose.
Phone 0800 DIMOND (0800 346 663).

7. Determine downpipe size. As a general rule for eaves gutters the downpipe sizes can be calculated as follows.

For circular downpipes:
The cross-sectional area should be one half the cross-sectional area of the gutter.

For rectangular downpipes:
The cross-sectional area should be one half the cross-sectional area of the gutter plus 10%.

**Note:** No downpipe shall be smaller than:

| | |
|---|---|
| Circular downpipe | 63mm (nominal available size is 80mm dia) |
| Rectangular downpipe | have a cross-sectional area of not less than 3250mm$^2$, and where the smallest dimension is at least 50mm. |

Ensure that the downpipe size can be accommodated within the sole of the gutter.

Where rainheads and sumps are used both internal or external more accurate sizing of downpipes are achieved using AS/NZS 3500 Part 3.2.

## (c) Overflow

Gutter and downpipe systems must be designed to accommodate any overflows that may result in water entering the structure, regardless of where the blockage occurs.

One option for eaves gutters is to ensure the top of the fascia board or cladding finishes above the top edge of the back of the gutter, including at the high point. A gap should be created between the fascia/cladding and the back of the gutter. This provides a continuous emergency overflow regardless of where the blockage occurs.

For rainheads and sumps care must be taken to ensure the capacity of the overflow is equal to or greater than the designed flow capacity of the downpipe. In many situations the head of water above the downpipe effectively increases its performance, whereas an overflow of equal dimension to the downpipe has a slower flow capacity.

## (d) Design Guidelines for Box Gutters

Below is a simple outline of the main points to consider when designing an internal box gutter.

Box gutters should be of sufficient structural strength to accommodate foot traffic and have a width that provides safe passageway (300mm plus allowance for overhang of roofing material).

The recommended minimum slope for any box gutter is 1:200.

Where steel is being considered to form the lining of box gutters, care must be taken to ensure easy inspection, maintenance and replacement is available. In most instances it is prudent to consider other materials such as rubberised membrane, copper or zinc as the relatively maintenance-free long term performance of these materials provide a more cost effective option over the life of the structure.

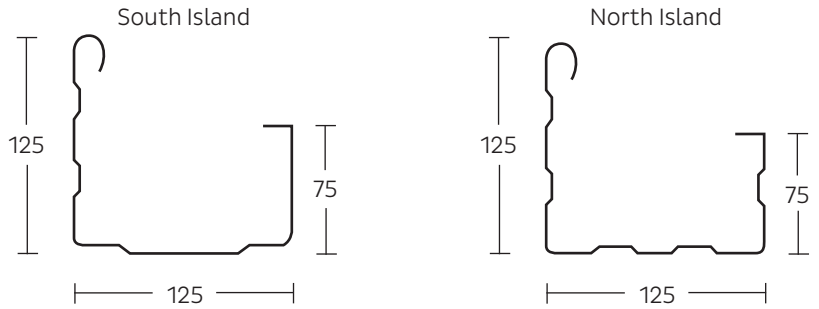
It is recommended that all box gutters discharge into a rainhead or sump, the depth of which can be chosen so as to permit the use of a downpipe of convenient size (the deeper the head of water above the outlet, the smaller the downpipe will need to be). The width of the rainhead or sump must be equal to or larger than the sole of the gutter.

All rainheads or sumps must have overflow systems designed to accommodate the water flow that is likely from the catchment area in the most intense rainfall for the geographical location.

An effective way to create an overflow in a rainhead is to set the front 25mm below the sole of the gutter. This will allow the water to weir over the front should the downpipe become blocked.

Where the gutter discharges into a sump positioned within a building, sufficient attention must be paid to the design of the overflow to ensure that the water flow from the catchment area is accommodated at all times. The depth of the rainhead or sump will determine the size of the downpipe required. This is due to the pressure that can be formed by the head of water above the outlet. However, the overflow system will most likely not have the head of water above it therefore it may need to be bigger than the main downpipe. The overflow drainage system must be capable of carrying all the water to the outside of the building as the overflow system will be activated only when the normal outlet is blocked.

# BOX 125




All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 15mm free board) | 7500mm$^2$ | |
| Flow capacity | 112 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular<br>Rectangular | 70mm<br>min. cross sectional area of 4125mm$^2$, smallest dimension at least 50mm. |

Catchment area per downpipe based on the above flow capacity is given in Table 3.1G. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

### Table 3.1G

| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Catchment Area per downpipe $A_c$ (m$^2$) | 168 | 134 | 111 | 96 | 84 | 75 | 67 | 56 | 48 | 42 | 37 | 33 |

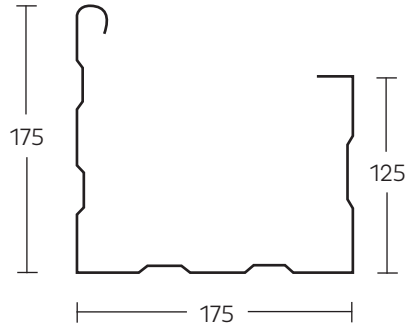
| | | |
|---|---|---|
| Material options including thickness and grade | Steel<br>Aluminium<br>Copper<br>Stainless steel | 0.55mm G300<br>0.90mm H34<br>0.55mm 1/2 hard<br>refer Dimond |
| Roll-forming facility | Auckland, Christchurch<br>(Note: all Dimond branches can fold gutter shapes with swages patterns to be confirmed at time of order) (1) | |

| | | | |
|---|---|---|---|
| Gutter bracket material and thickness | Internal<br>External | Galvanised<br>Hot dipped galvanised<br>Aluminium<br>Brass<br>Stainless steel | 1.15mm<br>3mm x 32mm<br>5mm x 30mm<br>3mm x 30mm<br>3mm x 30mm |

| | |
|---|---|
| Recommended maximum spacings | 900mm spacing<br>(refer section 3.1.4.7 for recommended spacings where snow fall is possible). |
| Bracket Centres | Aluminium 450mm Internal - 600mm External |
| Recommended fixings | Screw fastenings to suit substrate. |

(1) Internal brackets are not recommended with folded gutter without a 4mm diameter aluminium rivet fixing through the gutter and bracket.

# BOX 175




All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 15mm free board) | 19,250mm$^2$ | |
| Flow capacity | 363 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular<br>Rectangular | 115mm<br>min. cross sectional area of 10,600mm$^2$ |

Catchment area per downpipe based on the above flow capacity is given in Table 3.1H. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

## Table 3.1H

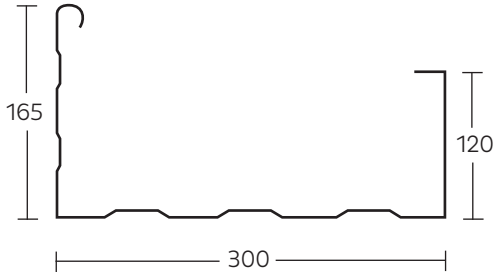
| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Catchment Area per downpipe $A_c$ (m$^2$) | 545 | 435 | 360 | 310 | 270 | 240 | 220 | 180 | 155 | 135 | 120 | 110 |

| | | |
|---|---|---|
| Material options including thickness and grade | Steel<br>Aluminium<br>Stainless steel | 0.55mm G300<br>0.90mm H34 offered in folded shape only<br>refer Dimond |
| Roll-forming facility | Hamilton<br>(Note: all Dimond branches can fold gutter shapes with swages patterns to be confirmed at time of order) (2) | |
| Gutter bracket material and thickness | Internal (1)<br>External | Galvsteel<br>Hot dipped galvanised<br>Aluminium<br>Stainless steel |
| | | 1.55mm<br>5mm x 30mm<br>7mm x 30mm<br>5mm x 30mm |
| Recommended maximum spacings | 900mm<br>(refer section 3.1.4.7 for recommended spacings where snow fall is possible).<br>Aluminium: 600mm | |
| Recommended fixings | Bolts or screw fastenings to be compatible with substrate and bracket material | |

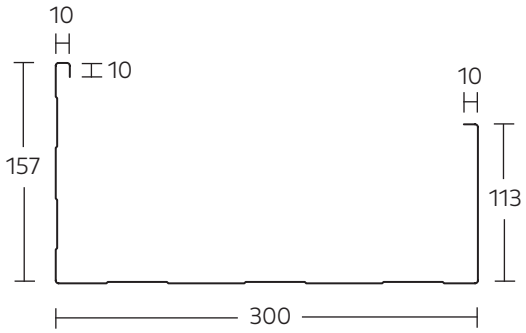
(1) Internal brackets are not recommended for use in areas that are subject to snow fall and/or wind above medium velocity (as determined by NZS 3604).

(2) Internal brackets are not recommended with folded gutter without a 4mm diameter aluminium rivet fixing through the gutter and bracket, it is better to use external brackets.

# BOX 300




Roll formed shape




Folded shape (based on strip girth (g) of 600mm)

All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 15mm free board) | 33,550mm² or 29,400mm² (g = 600mm) | |
| Flow capacity | 727 litres/min or 616 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular<br>Rectangular | 150mm<br>min. cross sectional area of 18,500mm² |

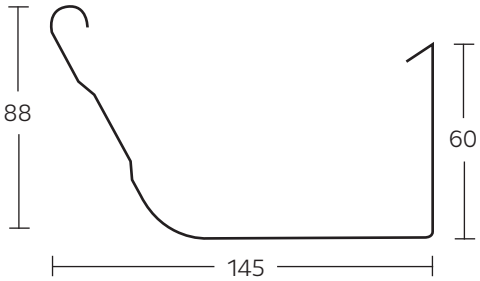
Catchment area per downpipe based on the above flow capacity is given in Table 3.1 I. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

### Table 3.1 I

| Roll formed shape | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
| Catchment Area per downpipe $A_c$ (m²) | 1090 | 870 | 725 | 620 | 545 | 485 | 435 | 360 | 310 | 270 | 240 | 215 |
| **Folded shape (based on strip girth of 600mm)** | | | | | | | | | | | | |
| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
| Catchment Area per downpipe $A_c$ (m²) | 922 | 738 | 615 | 527 | 461 | 410 | 369 | 307 | 264 | 231 | 205 | 184 |

| | | |
|---|---|---|
| Material options including thickness and grade | Steel | 0.55mm G300 |
| | Aluminium | 0.90mm H34 |
| | Copper | 0.55mm 1/2 hard |
| | Stainless steel | refer Dimond |
| Roll-forming facility | Hamilton<br>(Note: all Dimond branches can fold gutter shapes)<br>Dimensions may vary slightly from above. Check with your local Dimond branch. | |
| Gutter bracket material and thickness | External | Hot dipped galvanised 5mm x 50mm<br>Aluminium 6mm x 38mm<br>Stainless steel 5mm x 40mm |
| Recommended maximum spacings | 600mm (refer section 3.1.4.7 for recommended spacings where snow fall is possible). | |
| Recommended fixings | Bolts or screw fastenings to be compatible with substrate and bracket material. | |

# DEEP QUAD




All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 10mm free board) | 5435mm$^2$ | |
| Flow capacity | 75 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular<br>Rectangular | 60mm<br>min. cross sectional area of 2717mm$^2$, smallest dimension at least 50mm. |

Catchment area per downpipe based on the above flow capacity is given in Table 3.1J. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

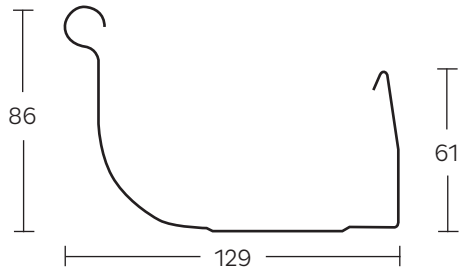
## Table 3.1J

| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Catchment Area per downpipe $A_c$ (m$^2$) | 112 | 90 | 75 | 64 | 56 | 50 | 45 | 37 | 32 | 28 | 25 | 22 |

| | | | |
|---|---|---|---|
| Material options including thickness and grade | Steel | 0.55mm G300 | |
| Roll-forming facility | Rotorua | | |
| Gutter bracket material and thickness | Internal | Aluminium | 2.0mm |
| Recommended maximum spacings | 900mm spacing<br>(refer section 3.1.4.7 for recommended spacings where snow fall is possible). | | |
| Recommended fixings | Screw fastenings to be compatible substrate and bracket material. | | |
| Stop ends | Zinc cast stop ends are available powder coated to match fascia colour. | | |

*When using aluminium internal brackets the roofing may need to be 10mm longer into the gutter to accommodate correct roof overhang into gutter.

# QUAD SI




All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 10mm free board) | 5485mm$^2$ | |
| Flow capacity | 75 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular<br>Rectangular | 60mm<br>min. cross sectional area of 2742mm$^2$, smallest dimension at least 50mm. |

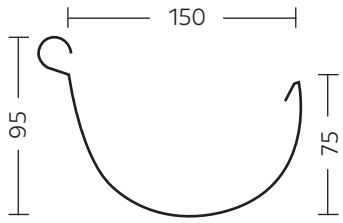
Catchment area per downpipe based on the above flow capacity is given in Table 3.1L. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

## Table 3.1L

| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Catchment Area per downpipe $A_c$ (m$^2$) | 112 | 90 | 75 | 64 | 56 | 50 | 45 | 37 | 32 | 28 | 25 | 22 |

| | | | |
|---|---|---|---|
| Material options including thickness and grade | Steel | 0.55mm G300 | |
| Roll-forming facility | Christchurch | | |
| Gutter bracket material and thickness | Internal | Galvanised | 1.15mm |
| Recommended maximum spacings | 900mm spacing (refer section 3.1.4.7 for recommended spacings where snow fall is possible). | | |
| Recommended fixings | Screw fastenings to be compatible with substrate and bracket material. | | |
| Stop ends | Zinc cast stop ends are available powder coated to match fascia colour. | | |

# 150 HALF ROUND




All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 10mm free board) | 6600mm$^2$ | |
| Flow capacity | 95 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular | 80mm |

Catchment area per downpipe based on the above flow capacity is given in Table 3.1M. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

## Table 3.1M

| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Catchment Area per downpipe $A_c$ (m$^2$) | 142 | 114 | 95 | 81 | 71 | 63 | 57 | 47 | 40 | 36 | 32 | 28 |

| | | | |
|---|---|---|---|
| Material options including thickness and grade | Steel | 0.55mm G300 | |
| Roll-forming facility | Christchurch & Invercargill<br>**Note:** only available in the South Island | | |
| Gutter bracket material and thickness | External | Aluminium | 4mm x 30mm |
| Recommended maximum spacings | 900mm spacing<br>(refer section 3.1.4.7 for recommended spacings where snow fall is possible).<br>Snow straps available. | | |
| Recommended fixings | Screw fastenings to be compatible with substrate and bracket material avoiding dissimilar metal contact. | | |

# GUTTER BRACKETS IN SNOWFALL AREAS

When installing gutters in areas subjected to snow fall in New Zealand, the gutter bracket spacings must be reduced and snow straps installed to take the increased snow weight that may be experienced during periods of snow fall to avoid damage to the gutter system.

This is a guide to the snow fall regions. Please refer to the standard AS/NZS 1170.3 for full details, available for purchase from www.standards.co.nz

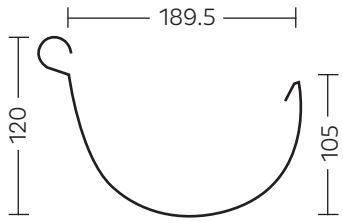
| | Sub Alpine Snow Region | Height above sea level (m) | Region description |
|---|---|---|---|
| North Island | N1 | 400 to 1200 | South of a line from Opotiki to Turangi and across to New Plymouth |
| South Island | N2 | 200 to 900 | West of Southern Alps from Nelson to Milford Sound |
| | N3 | 150 to 900 | Nelson East to Cheviot |
| | N4 | 0 to 900 | East of Southern Alps Cheviot to Moeraki into Omarama |
| | N5 | 0 to 900 | South of Moeraki around to Milford Sound |

**Note:** Regions with a height above sea level great than shown above require specific design and are outside Dimond recommendations.

| Dimond Gutter shape Type | Gutter Bracket | Maximum gutter bracket and snow strap spacing (mm) by Snow Region | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N1 | | N2 | | N3 | | N4 | | N5 | |
| | | Gutter brackets | Snow straps | Gutter brackets | Snow straps | Gutter brackets | Snow straps | Gutter brackets | Snow straps | Gutter brackets | Snow straps |
| 125 Quad | Internal | 600 | 900 | 600 | 600 | 600 | 600 | 600 | 500 | 600 | 600 |
| Deep Quad | Internal | 600 | 900 | 600 | 600 | 600 | 600 | 600 | 500 | 600 | 600 |
| Quad SI | Internal | 600 | 900 | 600 | 600 | 600 | 600 | 600 | 500 | 600 | 600 |
| Box 125 | Internal | 600 | 900 | 600 | 600 | 600 | 600 | 450 | 500 | 450 | 600 |
| Box 125 | External | 900 | 900 | 600 | 600 | 600 | 600 | 450 | 500 | 600 | 600 |
| Box 175 | External | 900 | 900 | 600 | 600 | 600 | 600 | 450 | 500 | 600 | 600 |
| Box 300 | External | 600 | 900 | 600 | 600 | 600 | 600 | 450 | 500 | 600 | 600 |
| 150 Half Round | External | 900 | 900 | 600 | 600 | 600 | 600 | 450 | 500 | 600 | 600 |
| 200 Half Round | External | 900 | 900 | 600 | 600 | 600 | 600 | 450 | 500 | 600 | 600 |

**Notes:**
1. Based on an 8m maximum single roof run.
2. Situations where upper roofs allow snow to fall onto lower roofs are excluded and require specific design
3. Each Snow strap is fixed to roof and into purlins using 2x 12 gauge self drilling screws or M6 Roofzips
4. Each Snow strap is fixed to the gutter using 2x 4.8mm dia alum rivets minimum
5. Snow strap min sizing to be 0.55mm x 25mm
6. Formed snow straps are available for 125 Quad, 150 Half Round & 200 Half Round

# 200 HALF ROUND




All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 10mm free board) | 14,200mm$^2$ | |
| Flow capacity | 248 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular | 80mm |
| Maximum downpipe | Circular | 150mm |

Catchment area per downpipe based on the above flow capacity is given in Table 3.1M. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

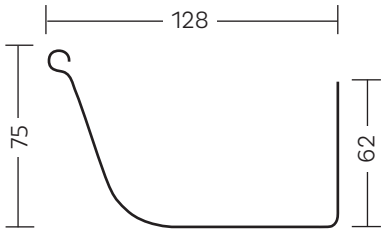
## Table 3.1M

| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Catchment Area per downpipe $A_c$ (m$^2$) | 371 | 297 | 247 | 212 | 185 | 165 | 148 | 124 | 106 | 93 | 83 | 74 |

| | | | |
|---|---|---|---|
| Material options including thickness and grade | Steel | 0.55mm G300 | |
| | Copper | 0.6mm Half hard | |
| Manufacturing facility | Christchurch & Invercargill<br>**Note:** only available in the South Island | | |
| Maximum length | 4.2m | | |
| Gutter bracket material and thickness | External | *Stainless steel | 3mm x 30mm |
| | Powder coated in matching colour. | | |
| | External | Brass (for use with copper gutter) | 2.5mm or 3.0mm x 50mm wide |
| Recommended maximum spacings | 900mm spacing<br>(refer section 3.1.4.7 for recommended spacings where snow fall is possible).<br>Snow straps available. | | |
| Recommended fixings | Screw fastenings to be compatible with substrate and bracket material avoiding dissimilar metal contact. | | |

***Note:** A PVC barrier tape must be placed between the inside of the bracket and the spouting.

# 125 QUAD




All dimensions given are nominal.

| | | |
|---|---|---|
| Effective cross sectional area (with 10mm free board) | 5670mm$^2$ | |
| Flow capacity | 79 litres/min | |
| Minimum recommended fall | 1:500 | = 2mm in 1m |
| Minimum downpipe | Circular<br>Rectangular | 80mm<br>min. cross sectional area of 2835mm$^2$, smallest dimension at least 50mm. |

Catchment area per downpipe based on the above flow capacity is given in Table 3.1J. Use Table 3.1B (Section 3.1.4) to determine the Rainfall Intensity to be used.

## Table 3.1J

| Rainfall Intensity, I (mm/hr) | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Catchment Area per downpipe $A_c$ (m$^2$) | 118 | 95 | 79 | 68 | 59 | 53 | 47 | 39 | 34 | 30 | 26 | 24 |

| | | | | |
|---|---|---|---|---|
| Material options including thickness and grade | Steel<br>Aluminium | 0.55mm G300<br>0.70mm H34 | | |
| Manufacturing facility | Invercargill | | | |
| Gutter bracket material and thickness | Internal<br>External | Zincalume®<br>Galvanised steel | 1.95mm<br>2.0mm | Q2<br>Q4 |
| Recommended maximum spacings | 900mm spacing<br>(refer section 3.1.4.7 for recommended spacings where snow fall is possible).<br>Snow strap available. | | | |
| Recommended fixings | Screw fastenings to be compatible substrate and bracket material. | | | |