

I'm a roof plumber – how do I prepare a Performance Solution to use Dam Buster Products?

Step 1 – Prepare the PBDB

When you prepare a quotation for the work, also provide the Dam Buster PBDB (Performance Based Design Brief) template to the Client to sign*.

Refer <https://www.dambuster.com.au/technical-downloads/>



* Note, you should fill in the job address and the sign the PBDB before providing to the Client.

Step 2– Prepare sketches & calculations

Prepare sketches and calculations for the proposed works. Refer to the Dam Buster Product Technical Statement or Quick Design Guide for how to do the calculations.

Refer also AS/NZS 3500.3-2021.



Step 3 – Prepare the Final Report

Select the appropriate Dam Buster Final Report*, complete this, and attach the sketches & calculations and signed PBDB. Job done.

* If you are a roof plumber in VIC or TAS, then use the Dam Buster Final Report template for PCA (VIC) or PCA (TAS). Otherwise, use the Dam Buster Final report for BCA Vol 2 (individual houses) and BCA Vol 1 (all other buildings).



BUILDING MATTER Roof Design using a Box Gutter System

This Final Report and/or Performance Solution is not valid if applied to non-genuine Dam Buster imitation copies. Dam Buster patented products have name plate ID and / or serial number ID as well as unique security features known only to Dam Buster. Patent and Intellectual Property infringers will be vigorously pursued.

PROJECT ADDRESS

17 Rivet Street, Melbourne VIC 3000

PROBLEM – Deemed to Satisfy (DTS) box gutter solution is not suitable for roof layout and / or is not aesthetically acceptable

Available DTS box gutter solutions provided in AS/NZS 3500.3 are not suitable for this project in one or more locations, as discussed in the Performance Based Design Brief.

SOLUTION – Use of proprietary box gutter devices

It is proposed to use the following **Dam Buster®** box gutter device(s) in lieu of the DTS box gutter solutions specified in AS/NZS 3500.3.

a) Box gutter overflow devices

- **Dam Buster®** Rainhead
- ~~**Dam Buster®** Side Outlet* and Rainhead combination~~
- ~~**Dam Buster®** Side Outlet* and Sump combination~~
- ~~**Dam Buster®** Sump and **Dam Buster®** Continuous Sump & **Dam Buster®** Back-to-Back Sump~~

Note - cross out devices not used

* T Side Outlet, End Side Outlet, Corner Side Outlet, and Cruciform Side Outlet

NOTES

1. Box gutters discharging to **Dam Buster®** box gutter overflow devices must be designed for free flow (in both the normal flow and overflow conditions), in accordance with Appendix H, Figure H.1 of AS/NZS 3500.3, for flows between 3 L/s and 16 L/s. All box gutters with calculated flow rates lower than 3L/s must be designed for a minimum of 3L/s.
2. In the normal flow condition, the **Dam Buster®** rainhead is fully compliant with AS/NZS 3500.3.
3. Testing of the **Dam Buster®** in the overflow condition was carried out by the AHSCA Research Foundation, and each rainhead was determined to have an overflow capacity exceeding 16 L/s.
4. Further to Note 1, all box gutters discharging to **Dam Buster®** devices can be designed 'independently'* of the **Dam Buster®** device in accordance with AS/NZS 3500.3 and are therefore considered to be 'Deemed-To-Satisfy' Solutions (when correctly designed and installed). Consequently, compliance is achieved in accordance with NCC Governing Provision **A2.4 A combination of solutions**, where:
 - The box gutter(s) is **Deemed-to-Satisfy**
 - The **Dam Buster®** device(s) is a **Performance Solution**

* The AS/NZS 3500.3 DTS Sump and Side overflow device, and Sump / High-capacity overflow device, are designed integrally with the box gutter(s) because, in the overflow condition, backwatering must occur in the box

gutter(s) itself i.e. the flow within the box gutter is no longer 'free flow' (as it is in the 'normal flow' condition').

5. The **Dam Buster® Side Outlet** may only be used in combination with a **Dam Buster® Rainhead** or the AS/NZS 3500.3 DTS rainhead or the **Dam Buster® Sump**. Similar to the **Dam Buster® Elbow**, the four types of **Dam Buster® Side Outlets** incorporate a specific step-down dimension to facilitate a change in direction of one or more box gutters and are hydraulically similar to the **Dam Buster® Elbow** and **Dam Buster® Junction**.

b) Change of direction in box gutter (not an overflow device)

- ~~**Dam Buster® Elbow**~~
- ~~**Dam Buster® Junction****~~

** Tee Junction and Corner Junction

Note - cross out devices not used

NOTE

The **Dam Buster® Elbow** and **Dam Buster® Junction** devices incorporate a specific step-down dimension and are effectively sumps with one open side. Hydraulic analysis by Dam Buster's Expert, and testing, demonstrates the step-down more than compensates for the energy loss in the bend, and consequently backwatering cannot occur in the upstream box gutter. The upstream box gutter(s) discharges into the 'open sided sump' and is designed in accordance with Figure H.1 of AS/NZS 3500.3 using the design flow rate (refer to the Product Technical Statement for the design methodology). Note, it is not necessary to design the downstream box gutter, which will automatically have sufficient depth due to the step-down.

Proposed roof drainage installation plans

Refer to the attached plans showing the proposed location of **Dam Buster®** products

Details / numbers of attached plans / sketches:

SK1 (23.05.2023)

Evidence of Suitability of **Dam Buster®** products

Refer to the **Dam Buster®** website for the current versions of the following documents:

Dam Buster® – Product Technical Statement

Dam Buster® – Evidence of Suitability

www.dambuster.com.au

Installation

Refer to the **Dam Buster®** website for the current version of the following document:

Dam Buster® - Installation manual

Relevant Performance Requirements (PCA) Victoria

Vic Part E3 Stormwater – Roof drainage systems

Performance Requirements

Vic E3P1 Roof drainage systems

A roof drainage system must dispose of stormwater flows from rainfall events having an *average recurrence interval* appropriate to:

- (a) The importance of the building;
- (b) The severity of potential damage to property, *loss* of *amenity*, illness or injury that would result from the failure of such a system.

Vic E3P2 Overflow

A roof drainage system must provide an overflow device to transfer stormwater flows by extreme rainfall events.

Vic E3P3 Watertightness

All internal roof drainage components must be *watertight*.

Vic E3P4 Design, construction and installation

A roof drainage system must ensure the following:

- (a) Stormwater is transferred to a *point of connection*;
- (b) Access for maintenance and clearing *blockages*.

A roof drainage installation must avoid the following:

- (a) *Loss* of *amenity* due to *blockages* and *uncontrolled discharge*.
- (b) Foul air and gases accumulating in the roof drainage system.
- (c) Loss to buildings and property *amenity* due to *blockages* and *uncontrolled discharge*.

Final report prepared by:

Roof Plumber's Name: John Black

Company: Rufus Constructions

Phone No: 0400 123 456

Licensing authority:

License #

Signed:

J. Black

Date:

30 May 2023

Attached – Performance Based Design Brief.

Roof Drainage Design & Rainhead Selection Example



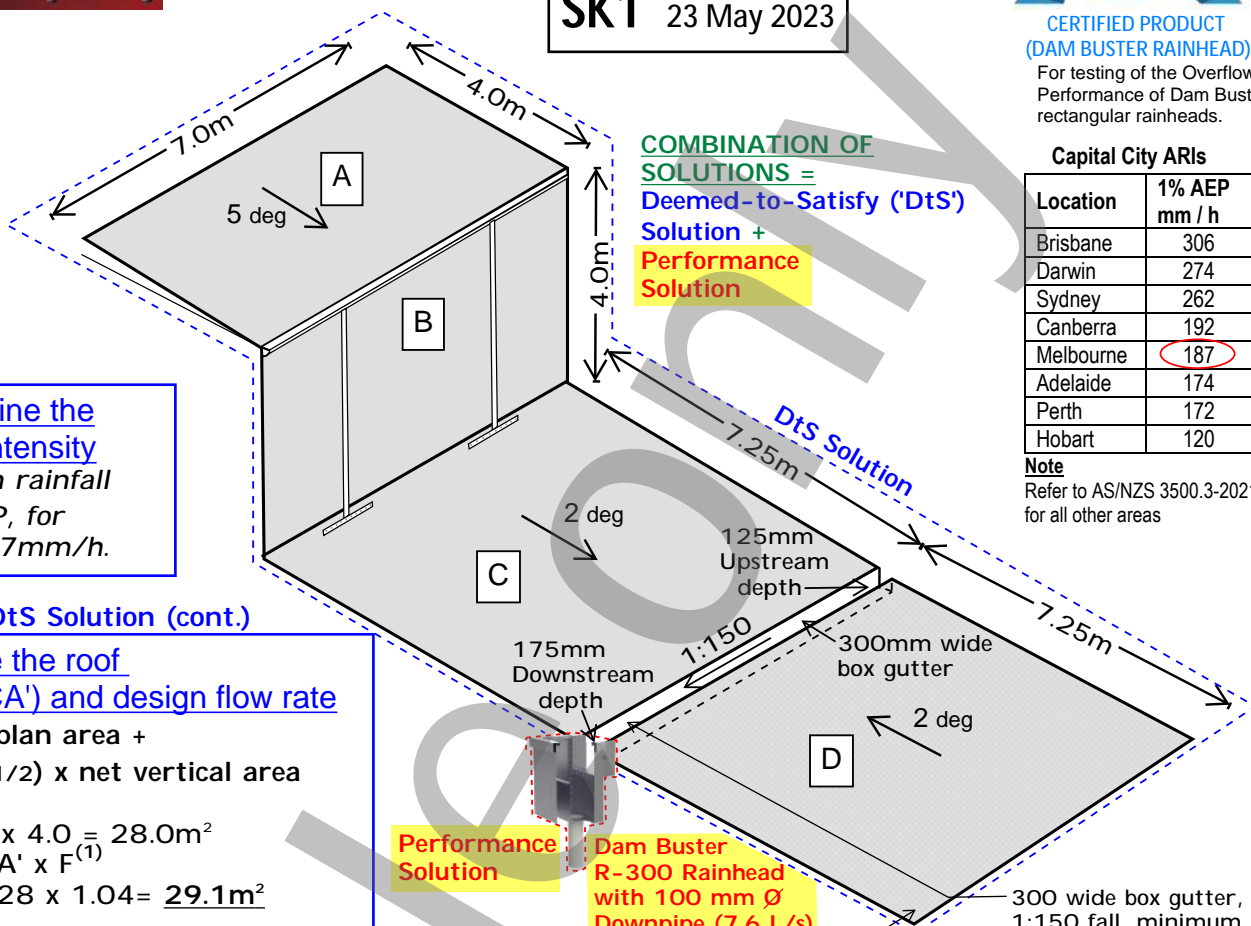
CERTIFIED PRODUCT (DAM BUSTER RAINHEAD)
For testing of the Overflow Performance of Dam Buster rectangular rainheads.

Capital City ARIs

Location	1% AEP mm / h
Brisbane	306
Darwin	274
Sydney	262
Canberra	192
Melbourne	187
Adelaide	174
Perth	172
Hobart	120

Note
Refer to AS/NZS 3500.3-2021 for all other areas

SK1 23 May 2023



COMBINATION OF SOLUTIONS = Deemed-to-Satisfy ('DtS') Solution + Performance Solution

DtS Solution

Step 1 - Determine the design rainfall intensity
Adopt the design rainfall intensity, 1%AEP, for Melbourne of 187mm/h.

DtS Solution (cont.)

Step 2 - Determine the roof catchment area ('CA') and design flow rate

Catchment Area = plan area + (1/2) x net vertical area

Roof A
Roof area 'A' = 7.0 x 4.0 = 28.0m²
Catchment area = 'A' x F⁽¹⁾
= 28 x 1.04 = **29.1m²**

Wall B
Wall area 'B' = 7.0 x 4.0 = 28.0m²
Catchment Area = 1/2 x 28.0 = **14.0m²**

Roofs C & D
Roof area = 2 x 7 x 7.25 = 101.5m²
Catchment Area = **101.5m²**

Total Catchment Area = 144.6m²

Q = (CA x 1% AEP) / 3600
= (144.6 x 187) / 3600
= **7.51 litres / sec**

DtS Solution (cont.)

Step 3 - Design the (300mm W) box gutter ('BG')

From Figure H.1 of AS/NZS 3500.3, a slope of 1 in 150⁽²⁾, and a flow rate of 7.51 L/s, the design upstream BG depth is 122mm (rounded to 125mm) (OR refer to Appendix F of the Product Technical Statement for BG design charts). The fall over 7.0m is 7000/150=47mm (rounded to 50mm).

ADOPT
300mm wide x (125 min to 175 max) deep BG

Performance Solution

Step 4 - Select the rainhead & DP combination

Referring to Table 1, select a Dam Buster R-300 Rainhead with a 100mm diameter downpipe.
Q(allowable) = 7.6 L/s > 7.51 L/s => OK

NOTE

The rainhead may be either a R-300 or CR-300
Refer also Appendix A of the Product Technical Statement, 'Product Names'.

Performance Solution

Dam Buster R-300 Rainhead with 100 mm Ø Downpipe (7.6 L/s)

Note
The vertical catchment component of the lower roofs, which have the same area, and having equally opposing slopes, cancel each other

300 wide box gutter, 1:150 fall, minimum depth designed in accordance with Figure H.1 of AS/NZS 3500.3

CALCULATIONS - NOTE

Steps 1 to 3 are calculations required in relation to the DtS component of the 'Combination of Solutions'.
Step 4, which is a Selection process only (highlighted in yellow), represents the Performance Solution component.

Step (1) & (2) notes

- Refer to Table 3.4.3.2 of AS/NZS 3500.3-2021 for the factor 'F'. This factor depends on the roof slope, and takes into account the extra catchment area for the roof due to the slope i.e. half the projected vertical area of the sloping roof.
Note, 'F' can also be calculated: $F = 1.0 + 0.5 \times \tan(\text{slope})$ (a scientific calculator is required to calculate F)
- Dam Buster recommends a minimum fall of 1 in 150 to allow for possible minor future building movements, particularly on reactive clay sites.

Dam Buster Rainhead Design Table

Downpipe size	Equivalent diameter	Dam Buster Rainhead size ⁽¹⁾				
		R-200	R-300	R-400	R-500	R-600
100 x 50	79	4.00 ⁽²⁾				
80 diam.	80	4.00 ⁽²⁾			Not recommended or not possible	
90 diam.	90	4.70	6.50			
100 x 75	97	5.00	7.30	8.00		
100 diam.	100	5.00	7.60	8.80	8.80	
100 x 100	112		8.80	12.0	12.0	
125 diam.	125		9.50	14.2	15.4	15.9
150 x 100	137			15.8	16.0	16.0
150 diam.	150			16.0	16.0	16.0
Overflow Capacity of Device (L/s)		>16.0	>16.0	>16.0	>16.0	>16.0

(1) Curved fronted rainheads CR-xxx have the same capacity as rectangular rainheads
(2) Capacities determined by testing by the AHSCA Research Foundation

Maximum permissible flow rates (litres / sec)

BUILDING MATTER – Roof drainage design using a box gutter system

PROJECT ADDRESS

17 Rivet Street, Melbourne VIC 3000

SCOPE

This PBDB relates to the design of a box gutter system forming part or all of the roof drainage system for the subject property.

Roof drainage is regulated in the states and territories of Australia in different ways. The NCC provides Deemed-To-Satisfy solutions for box gutter systems using the following acceptable construction manual, applicable in all states and territories:-

AS/NZS 3500.3 Plumbing and drainage Part 3: Stormwater drainage

Additionally, the following handbooks are also applicable in some states and territories:-

SA HB 39 Installation code for metal roof and wall cladding

SAA/SNZ HB114 Guidelines for the design of eaves and box gutters

PROBLEM - DfS box gutter solution is not suitable for roof layout and / or is not aesthetically acceptable

Available DfS box gutter solutions provided in AS/NZS 3500.3 ('3500.3') are limited to the following three box gutter overflow devices only:

- Open fronted rainhead in accordance with Figure 3.7.3 (a) of 3500.3
- Sump / side overflow device in accordance with Figure 3.7.3 (b) of 3500.3
- Sump / high capacity overflow device in accordance with Figure 3.7.3 (c) of 3500.3

Further information on DfS box gutter systems is provided in the VBA's Plumbing Practice Note RP-02: Box Gutters. Whilst this is a Victorian publication, it provides a general overview of the available box gutter overflow devices in 3500.3.

https://www.vba.vic.gov.au/_data/assets/pdf_file/0009/135684/RP-02-Box-Gutters.pdf

The available DfS solutions for box gutter overflow devices provided in 3500.3 are very limiting with respect to the design of roof drainage, and the following is noted in particular:

- The rainhead in accordance with Figure 3.7.3 (a) of 3500.3 is generally not aesthetically acceptable because it is open fronted
- None of the 3500.3 devices permit a change in direction of box gutters
- Further to the above, clause 4.7.1 of 3500.3 states 'Gutters shall not be jointed along the length to increase the gutter depth'. However, this may be necessary in order to achieve a change in direction.
- The Sump / high capacity device is complicated to fabricate

Alternative proprietary roof drainage products will be considered for suitability for this project under a Performance Solution.

KEY STAKEHOLDERS (strike out whichever is not applicable)

Building owner / ~~building owner's representative~~

Name: Jim Green

Company: _____ Phone No: 0403 222 333

Signed: J. Green Date: 21 May 2023

Roof drainage designer - ~~Civil / Hydraulic Engineer or Roof plumber~~

Name: John Black

Company: Rufus Constructions Phone No: 0400 123 456

Registration Category: _____ Registration # _____

Signed: J. Black Date: 20 May 2023

Building surveyor / Building certifier

Name: Steven Gray

Company: Compliant Building Surveying Phone No: 0490 123 456

Licensing authority: VBA Registration # 1234

Signed: S Gray Date: 20 May 2023

Architect / Building Designer

Name: _____

Company: _____ Phone No: _____

Signed: _____ Date: _____

Builder

Name: _____

Company: _____ Phone No: _____

Signed: _____ Date: _____

Other (specify)

Name: _____

Company: _____ Phone No: _____

Role in project: _____

Signed: _____ Date: _____

Certifier's Name		Licence No.		Compliance Cert No.	Compliance Cert PIN

INSTALLATION ADDRESS			
Site Address	17 Rivet Street		
Town/Suburb	Melbourne VIC	Post Code	3000

PLUMBING WORK INFORMATION		BELOW GROUND SANITARY DRAINS	
Date of completion of plumbing work	10/05/2023	'As Laid' plans lodged	
Value of plumbing work	\$1000 - \$4999	Water Authority 'Consent to Connect' number	

TYPE OF WORK		GAS METER / LPG	
Residential / Commercial	Residential	Authorisation number	

SPECIALITY DETAILS			
Modification details		Recreational vehicle's chassis number	
Cooling tower		Performance solution	✓
6 Star Sustainability			

INSTALLATION INFORMATION
The installation is in accordance with section 4 of AS/NZS 3500.3-2021 and SA HB39-2015. Additionally, Dam Buster products have been installed in accordance with the Dam Buster Installation Manual, refer to www.dambuster.com.au

INSTALLATION DETAILS
Installation of roof sheeting, box gutters, rainheads and downpipes. Dam Buster rainhead used under a Performance Solution (documentation provided).

APPLIANCE/PRODUCT INFORMATION

DECLARATION

I certify that the above plumbing work complies in all respects with the plumbing laws as defined in Part 12A of the *Building Act 1993*.

The plumbing work was carried out by me or under my supervision			✓
I have inspected and tested the work started by another licensed practitioner. Any necessary further work was carried out by me or under my supervision			
The above compliance certificate details are correct and ready to be lodged with the VBA			✓
I provide this compliance certificate in accordance with 221ZH(2)(a) of the Building Act 1993 initiating the status of a signed document			✓
Compliance Certificate Status	Lodged	Date Lodged	21/05/23

IMPORTANT NOTE TO PRACTITIONERS

A misstatement of fact, including an omission, is an offence under the *Building Act 1993*.

This Compliance Certificate must be given to the owner/consumer (or if issued to a building practitioner or person other than the owner/consumer), then that person must give it to the consumer within five (5) days of receipt.

IMPORTANT NOTE TO CONSUMERS

Information on this Compliance Certificate has been given to the Victorian Building Authority (VBA) in accordance with the *Building Act 1993*. The information also assists the VBA for its statutory functions to monitor and enforce compliance under that Act and for statistical purposes in a way that does not identify consumers. At www.vba.vic.gov.au you may view the details of this Compliance Certificate by using the Compliance Certificate number and PIN number in the top right corner of this Compliance Certificate, and also view the VBA's Privacy Policy. All work subject to a Compliance Certificate carries insurance to protect the owner/consumer against defective work by a plumbing practitioner. You should retain your Compliance Certificate for six (6) years as evidence of your cover.