RAINWATER SOLUTIONS

WESTERN AUSTRALIA

For illustration purposes only – products shown not available in all states.

RAINWATER SOLUTIONS

Water overflow in domestic rainwater systems

Under the Environmental Planning and Assessment Act 1979 and its Regulations, all building work must be carried out in accordance with the Building Code of Australia (BCA). In addition to referring to Australian Standards AS/NZS 3500.3 (2003), and AS/NZS 3500.5 (2000), the BCA also contains requirements for the disposal of surface water in Volume One, in Performance Requirements FP1.2 and FP1.3, and in Volume Two, in Part 3.5.2, namely, Performance Requirements P2.2.1 and Clauses 3.5.2.1 and 3.5.2.4.

The most common means to satisfy these requirements for roof drainage (i.e. guttering) installations is via compliance with the National Plumbing and Drainage Code AS/NZS 3500.3: 2003.

Furthermore, in each state and territory it is necessary to satisfy the relevant regulation. For example, the NSW Code of Practice for Plumbing and Drainage (2006) adopts AS/NZS 3500.3: 2003 and associated amendments. (Further information is available at www.deus.nsw.gov.au/water/plumbing.asp).

In the design and detailing of a roof drainage system consideration must be given to a range of the factors such as rainfall intensity, roof catchment area, gutter size/capacity, gutter fall, gutter outlets (sumps, rainheads, nozzles), downpipe size, quantity and placement, overflow consideration, material selection, jointing, etc.

IMPORTANT INFORMATION ON OVERFLOW MEASURES

For residential roof drainage systems high fronted gutters are a popular aesthetic choice to hide the lower edge of tiles or roof cladding.

Some simple overflow methods that can be employed on high fronted gutters are listed below;

A) Methods related to the design and installation of roof drainage systems:

- Slotted front of gutter – a simple and popular choice which allows for water overflow through the slots visible on the front face of the gutter.
- Specifically located overflows as permitted in the BCA i.e.:
  - Inverted downpipe drop/pop at high points in the gutter but set at a level below the fascia top,
  - Stop ends cut down to a lower level to act as a weir (stop ends weirs could be hidden at the high point of the gutter and designed as part of an expansion joint),
  - Rainheads with overflow weir,
  - Holes, slot, or weir at downpipes;
  - Gap between the fascia and the gutter back – a packer is inserted between the gutter back and the fascia; or

Any of a number of other proprietary systems and trade solutions.

B) Methods related to alternative building design methods:

- Unlined eaves – eliminates the issue where the house design suits.
- Gutter installed such that the gutter front is fully below the top of the fascia.
- Design for a higher rainfall intensity, as used for internal box gutters.
- Back flashing – where gutter support brackets allow back flashing installation (e.g. external brackets).

The following illustrations (page 4) show continuous and non-continuous overflow measures that may be used in combination with each other to meet the necessary requirements.

Please note that non-continuous measures may become blocked anywhere along their length, so non-continuous overflow measures may not be sufficient to prevent water from flowing back into a building.

Slotted gutters may also provide an overflow measure, however slots must be of sufficient size. For this reason, slots alone may not be a sufficient overflow measure in all circumstances. When designing a roof drainage system with slotted gutter, consideration should be given to additional overflow measures.

Typical overflow from slotted gutter.

(Gutter shown is not available in all areas).

DESIGN AND INSTALLATION OF DOMESTIC ROOF DRAINAGE SYSTEMS

The detailing and sizing of the selected overflow method/s is normally completed by the designer/installer, but must be adequate for the situation and must meet the relevant performance requirement of the BCA and Australian Standards.

While there may be some variations from state to state, contractors who install guttering systems are generally required to hold an appropriate licence. In NSW, for example, a licence in the category of Builder, Plumber or Roof Plumber issued by the Office of Fair Trading is required and it is an offence to undertake this work without an appropriate licence. The work is required to comply with the appropriate codes and standards.

Statutory warranties normally apply and consumers have a right to lodge a complaint and have it dealt with by the appropriate authority. In NSW, for example, the statutory warranty is 7 years under the Home Building Act.

In the installation of the roof drainage system, particular focus should be given to the following;

- Attention to the use of compatible materials for drainage system components, leaf-guard type system components and compatible fasteners/sealants to connect and seal the components.
- The position of the gutter in relation to the fascia.
- Installation of the specified gutter and downpipes, ensuring that downpipes are installed in the correct locations and numbers.
- Gutter fall, ensuring sufficient fall and that it is in the direction of the downpipes.
- Overflow has been considered and specific details are installed where required (such as when the gutter front is higher than the top of the fascia).

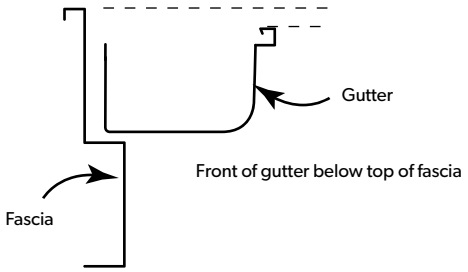
During the installation all debris and loose waste materials (swarf, fasteners, etc.) must be cleaned off at the end of each day and at the completion of the installation to prevent blockages of the drainage system or deterioration of the individual components. Any protective films should also be removed as part of the installation process.

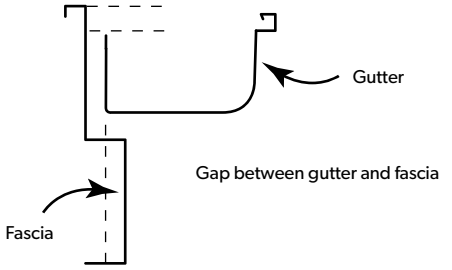
MAINTENANCE OF DOMESTIC ROOF DRAINAGE SYSTEMS

In the longer term, the ability of a roof drainage system to handle overflow will also depend on the regular cleaning of the system. For example the removal of plant or animal matter (leaves, fungal growth, dropping, nests, etc.) and debris from gutters, leaf-guard type systems and the gutter overflow devices to ensure free drainage of water.

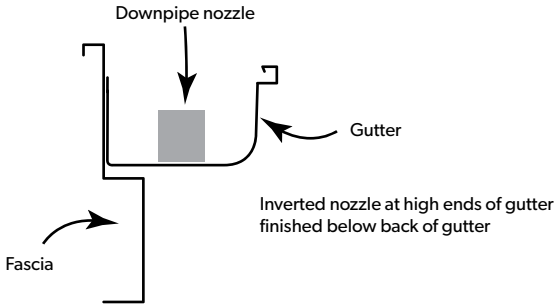
To ensure a long life the roof drainage system the maintenance requirements of the roof drainage system should be forwarded to the occupier/owner of the building and should be fulfilled. Adequate maintenance is a requirement of rainwater good warranties.

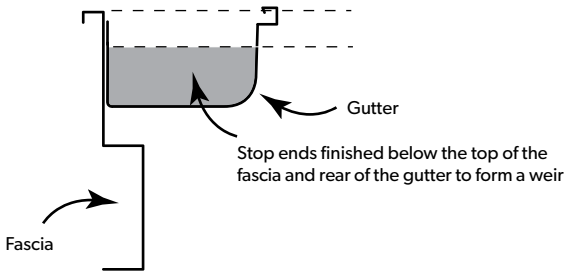
Continuous (full length) overflow measures





Non-continuous (specifically located) overflow measures





Information on designing a perimeter drainage system for a domestic roof

Roof drainage systems can be affected by a number of variables and must be designed and detailed by a suitable qualified trade or professional. The design of roof drainage aims to protect people, property and the building. The designed drainage system must be installed under the supervision of a qualified trade or professional. The steps of the design process are illustrated below.

1. Determine average recurrence interval (ARI).
2. Obtain rainfall intensity of site.
3. Work out roof dimensions.
4. Catchment area with slope.
5. Work out area for proposed eaves gutter.
6. Determine catchment area per downpipe.
7. Determine number of downpipes required.
8. Determine location of downpipes and high points.
9. Check catchment area for each downpipe.
10. Determine downpipe size.
11. Determine overflow measures.

Table 1

Average recurrence interval (ARI).

Design rainfall intensities adapted from AS 2180:1986.

	For overflow of eaves gutters once in 20 years mm/hr	For overflow of gutters once in 100 years mm/hr
WA		
Abydos	199	275
Albany	142	217
Broome	252	343
Bunbury	148	215
Carnarvon	142	196
Collie	145	217
Dampier	231	337
Derby	254	343
Geraldton	132	173
Halls Greek	181	237
Hamersley	180	244
Hillside	192	265
Kalgoorlie	116	180
Katanning	125	203
Kununurra	256	347
Marble Bar	205	287
Meekatharra	111	155
Mundaring	139	204
Newman	143	195
Perth	146	214
Port Hedland	233	332
Roy Hill	160	216
Tom Price	164	222
Wittenoom	182	245

DESIGN PROCEDURE

The steps in the design process are for a perimeter drainage system using the standard roll-formed rainwater products (gutters) installed at the building eaves. Drainage systems for larger roofs use box gutters at the perimeter and internally. Box gutter systems are thoroughly treated in AS/NZS 3500.3:2003 and HB114:1998.

Install gutters with a suitable fall to avoid ponding and to allow water to easily flow away. Steeper falls are preferred for prolonged life of the gutter. It is assumed that the eaves and gutters will have a gradient of 1:500 or steeper.

1. Decide on the average recurrence interval (ARI). Where significant inconvenience or injury to people, or damage to property (including contents of a building), is unlikely, a minimum ARI can be 20 years. If these conditions are likely, 100 years is recommended.
2. Determine rainfall intensity for the site from Table 1. More data are in AS/NZS 3500.3.2:2003.
3. Sketch a roof plan showing dimensions in plan view, pitch of roof, layout of ridges and valleys and large roof penetrations.
4. Calculate the catchment area of the roof from the plan. To allow for the slope of the roof, increase the plan area by 1% for every degree of pitch up to 36°. For pitches over 36° refer to AS 3500.3: 2003.
5. Get the effective cross-sectional area of the gutter you intend to use from Table 2.
6. Using the cross-sectional area of the gutter on the graph in Figure 1, determine the catchment area per downpipe.
7. Calculate (as a first test) the minimum number of downpipes required for the selected gutter using the equation:

$$\left.\begin{array}{l}\text{Number of}\\ \text{downpipes (min.)}\end{array}\right\} = \frac{\text{Total catchment area of the roof}}{\text{Catchment area (determined in 6)}}$$

   Round the number of downpipes up to the next whole number.
8. On the plan, select locations for the downpipes and the high points in the gutters. Where practical, the catchments for each downpipe should be about equal in area.
   When selecting the location of high points and downpipes, consideration should also be given to proximity to high concentrations of water flow (e.g. valley gutters, diversions around large roof penetrations, dormers, etc.) More guidance is given in AS/NZS 3500.3:2003 and BCA.
   Calculate the area of each catchment for each downpipe.
9. With the area of your eaves gutter, check that the catchment area for each downpipe, calculated in Step 8, is equal to or less than the catchment area shown by the graph.
   If a catchment area is too big then you can:
   - Increase the number and size of downpipes;
   - Reposition the downpipes and/or the high points;
   - Choose a gutter with bigger effective cross-sectional area, then repeat the above from Step 6.
10. Decide on the downpipe size. Recommendations in AS/NZS 3500.3:2003 on downpipe sizes. As an approximate guide, refer to Table 2.
11. Consider measures to counter overflow of gutters into the building. Consideration of overflow at high concentrations of water flow may need to be given.

Table 2

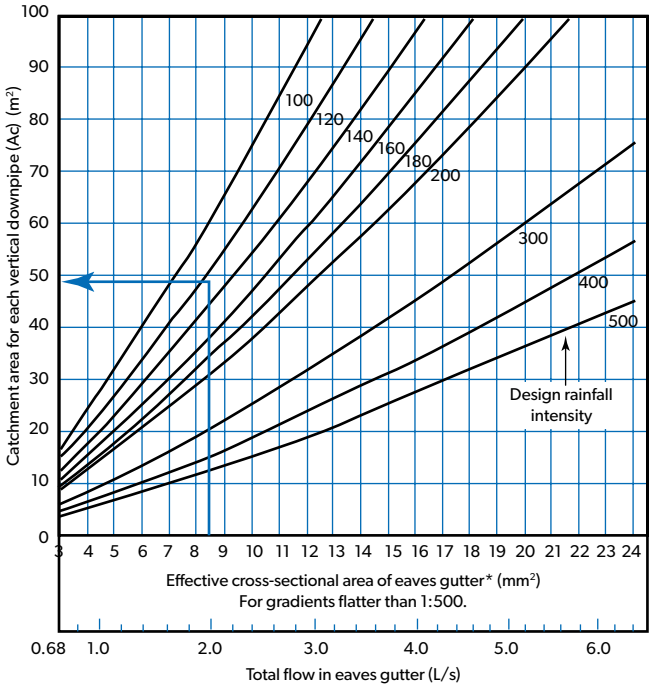
LYSAGHT® gutter areas and downpipes.

		Minimum standard downpipe sizes to suit gutters with fall <1:500		
	Slotted	**Effective cross section**[1]	**Round (diameter)**	**Rectangular or square**
	yes/no	mm^2	mm	mm
SHEERLINE®	no	8370	90	100 x 50
RANCELINE® (WA)	no	6319	90	95 x 45
COLONIAL® (WA)	no	6906	75	95 x 45
Square Bead Quad	no	5420	75	95 x 45
Half Round	no	7335	90	100 x 50
Quarter Round	no	5605	90	95 x 45

1. Values calculated in accordance with AS/NZS 2179.1:1994.
2. Downpipe sizes are based on being fitted to the sole of the gutter.
3. For different downpipe connections refer to a suitably qualified designer for guidance.
4. For steeper gutter slopes refer to AS 3500.3 for guidance.

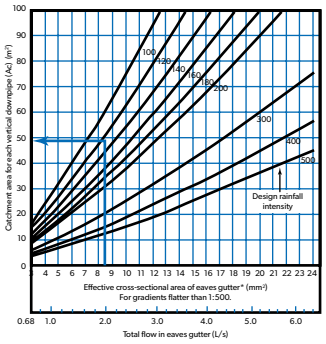
Figure 1

Cross-sectional area of eaves gutters required for various roof catchment areas (where gradient of gutter is less than 1:500). (Adapted from AS 3500.3:2003).



* See AS/NZS 2179.1.

EXAMPLE
Find the minimum catchment area for each downpipe on a house in Katanning using unslotted SHEERLINE® gutter.



Method
Using the gutter cross sectional area taken from Table 2 (shown across the bottom of the graph) draw a line upwards until it intersects with the Design rainfall intensity (Table 1). Draw a line at 90º to determine the catchment area for each downpipe.

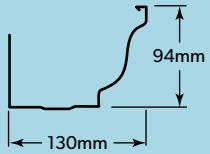
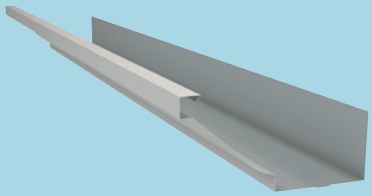
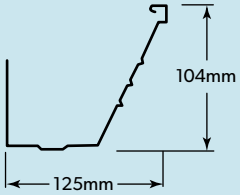
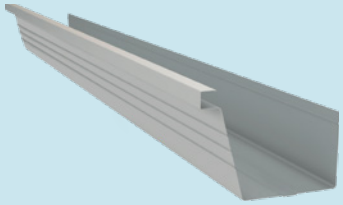
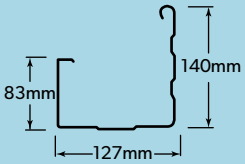
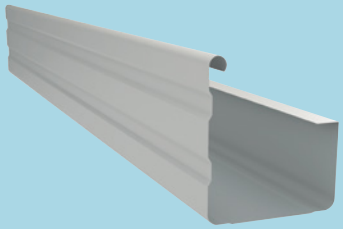
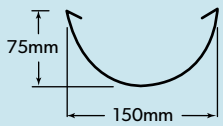
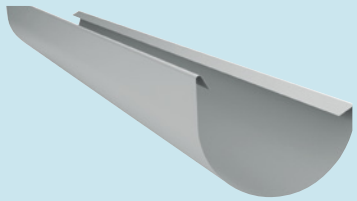
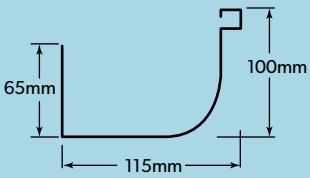
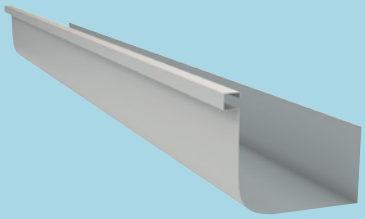
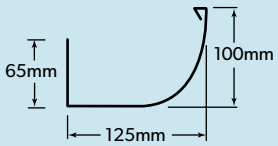
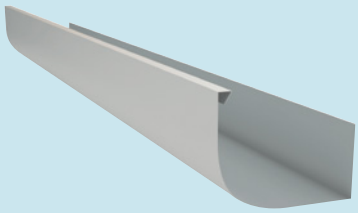
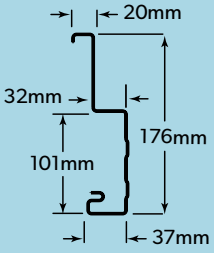
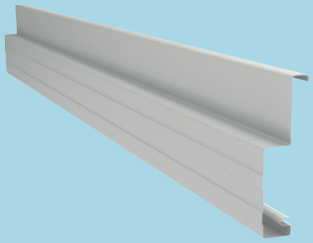
DATA
Design rainfall intensity = 125 (Table 1)
Gutter area = 8370 (Table 2)

SOLUTION (From Figure 1)
Catchment area for each downpipe = $49m^2$

Notes:

1. This graph assumes -
   a. an effective width to depth is a ratio of about 2:1;
   b. a gradient in the direction of flow flatter than 1:500;
   c. the least favourable positioning of the downpipe and bends within the gutter length;
   d. a cross-section or half round, quad, ogee or square; and
   e. the outlet to a vertical downpipe is located centrally in the sole of the eaves gutter.
2. The required eaves gutter discharge areas do not allow for loss of waterway due to internal brackets.

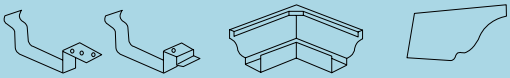
LYSAGHT® GUTTERS, FASCIA AND ACCESSORIES

COLONIAL® (WA)		
RANCELINE® (WA)		
SHEERLINE®		
HALF ROUND		
QUAD SQUARE BEAD		
QUARTER ROUND		
NOVALINE® Rebate Fascia		

LYSAGHT® quality gutters are available in unpainted ZINCALUME® steel and in a range of COLORBOND® steel colours to match or contrast your roof.

- Distinctive style accents traditional homes while providing a unique look for new homes
- Compatible with NOVALINE® Fascia System for quick, easy attachment to the building
- Available in a range of COLORBOND® steel colours to match or complement your roof
- Suitable for steel or tile roofs

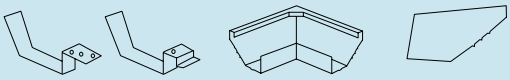
ACCESSORIES



Gutter clip for timber | **Gutter clip for metal** | **External or internal mitre** | **Stop end plate (left or right)**

- Unique, stylish gutter with bold lines and good drainage capacity
- Compatible with NOVALINE® Fascia System for quick, easy attachment to the building
- Available in a range of COLORBOND® steel colours to match or complement your roof
- Suitable for steel or tile roofs

ACCESSORIES



Gutter clip for timber | **Gutter clip for metal** | **External or internal mitre** | **Stop end plate (left or right)**

- Popular for home improvement projects like patios, pergolas and sheds and for use with high profile roofing laid at low pitches or traditional domestic roofs requiring large water carrying capacity
- Concealed fixing offers clean and seamless finish

ACCESSORIES

Internal bracket Unpainted and PC

Universal gutter clip (SGCI) Unpainted and PC

Internal end stop (pair) ZINCALUME® & COLORBOND®

- Large water carrying capacity for high rainfall areas and large roof sizes
- Unique curved base allows self-cleaning and prevents build-up of water and dirt
- Complemented with a range of accessories

ACCESSORIES

Half round gutter clip Galvanised

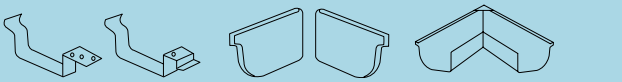
Half round stop ends ZINCALUME® & COLORBOND®

Half round External corner ZINCALUME® & COLORBOND®

Half round Internal corner ZINCALUME® & COLORBOND®

- Distinctive design that combines the popular Quad profile with the accent of a square bead
- Available with optional slotting to allow overflow where alternative overflow devices are not installed
- Mitred corners available as tradework to suit any shaped roof
- Suitable for steel or tile roofs

ACCESSORIES



Gutter clip for timber ZINCALUME®

Gutter clips for metal ZINCALUME®

Stop end (pair) ZINCALUME® & COLORBOND®

Internal or external gutter mitre available as tradework ZINCALUME® & COLORBOND®

- Unique stylish gutter complements modern homes
- Popular for home improvement projects
- Suitable for steel or tile roofs
- Available in a range of COLORBOND® steel colours to match or complement your roof

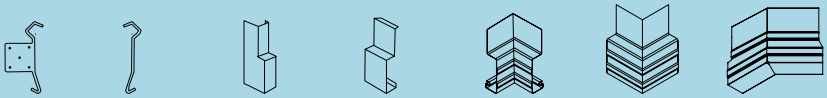
ACCESSORIES

Gutter clip for metal

Stop ends (left or right) ZINCALUME® & COLORBOND®

- State-of-the-art fascia system
- Integrates perfectly with COLONIAL® (WA), RANCELINE® (WA), Quad and TRIMLINE® gutters
- Replaces traditional timber fascia which reduces painting and maintenance
- Makes fixing gutters quick and easy using spring clips
- Extensive range of accessories available

ACCESSORIES



Side rafter bracket ZINCALUME®

Timber bracket ZINCALUME®

End closer ZINCALUME® & COLORBOND®

Splice plate ZINCALUME®

Internal corner ZINCALUME® & COLORBOND®

External corner ZINCALUME® & COLORBOND®

135º corner ZINCALUME®

DOWNPIPES & ACCESSORIES

Completing your rainwater system

Finish your roof with the distinctive style of the LYSAGHT® downpipes and accessories. These downpipes and accessories are compatible with the NOVALINE® Fascia System, and with a wide range of gutters.

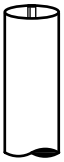
All LYSAGHT® downpipes and accessories are made from galvanised or ZINCALUME® steel, which means they are strong and made to last.

Most downpipes and accessories are available in unpainted ZINCALUME® steel and a range of COLORBOND® steel colours to match or contrast with your roof. They are compatible with steel and tile roofs.

A wide range of rectangular, square and round downpipes available to complement all building styles. Some dimensions and availability may vary slightly from region to region.

DOWNPIPES

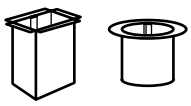
Rectangular or square
95x45
100x50
100x75
100x100



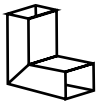
Round
75
90
100

DOWNPIPE ACCESSORIES

Astragal/brackets

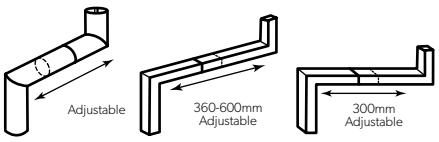


Pops



Square corner

Round corner



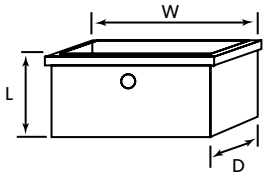
Offsets

RAINHEADS

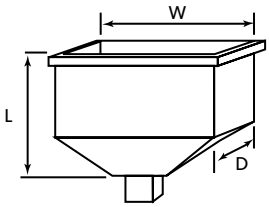
Made to order to your specifications

- LYSAGHT® rainwater heads, flashing, tradework and box gutters, are also available made to order. Provide us with a picture, dimensioned drawing or template and we can manufacture for you.
- Refer to the Western Australia product offer for the full range of tradework and flashing products available. Ask your technical sales representative for details.

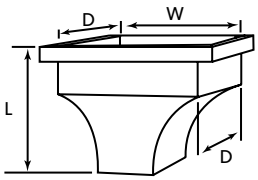
RAINHEADS



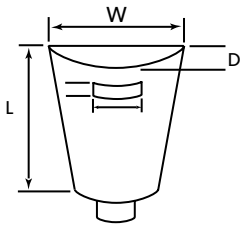
Classic
Standard Sizes
Small: 250 (L) x 300 (W) x 225 (D) mm
Medium: 250 (L) x 375 (W) x 225 (D) mm
Large: 300 (L) x 450 (W) x 250 (D) mm



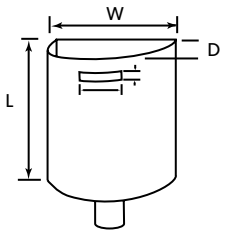
Tapered Classic
Standard Sizes
Small: 320 (L) x 300 (W) x 200 (D) mm
Large: 450 (L) x 450 (W) x 250 (D) mm



Antique/Colonial
Standard Sizes
Small: 340 (L) x 260 (W) x 170 (D) mm
Large: 340 (L) x 290 (W) x 195 (D) mm



Conical
Standard Sizes
Large: 600 (L) x 500 (W) x 250 (D) mm
Overflow hole: 100mm x 30mm



The Bushranger
Standard Sizes
Small: 250 (L) x 260 (W) x 240 (D) mm
Medium: 350 (L) x 260 (W) x 240 (D) mm
Large: 450 (L) x 360 (W) x 260 (D) mm
Overflow hole: 100mm x 30mm

INSTALLATION ADVICE

Get it right first time with LYSAGHT® products

BRACKET SPACING

When the gutters are attached to NOVALINE® fascia, then the gutter bracket spacing should mirror the spacing of the NOVALINE® brackets (i.e. 600mm & 1200mm), and the gutter brackets should be adjacent to the NOVALINE® brackets.

However, when the gutters are fixed to other fascias then the weight of the water carried by the gutter should determine spacing required - however spacing should not exceed 1200mm maximum.

FALL

Install gutters with a suitable fall to avoid ponding and to allow water to easily flow away. Steeper falls are preferred for prolonged life of the gutter. Refer to the BCA and the Australian Standards for guidance.

METAL & TIMBER COMPATIBILITY

Lead, copper, bare steel and green or some chemically-treated timber are not compatible with this product; thus don't allow any contact of the product with those materials, nor discharge of rainwater from them onto the product. If there are doubts about the compatibility of other products being used, ask for advice from our information line.

ROOF DRAINAGE SYSTEM DESIGN

Roof drainage systems should be designed and detailed by a suitably qualified trade or professional in accordance with the BCA and the Australian Standards. Particular reference should be made to the correct sizing of gutter; quantity and placement of downpipes; and the provision of appropriate overflow devices. (Page 2-3).

ADVERSE CONDITIONS

If these products are to be used within 1km of marine, severe industrial, or unusually corrosive environments, ask for advice from our information line.

INSTALLATION ADVICE

The roof drainage system should be installed using good trade practices and by a certified installer.

For sealed joints use screws or rivets and neutral-cure silicone sealant branded as suitable for use with galvanised or COLORBOND®/ZINCALUME® steel.

CLEAN UP

Remove all plastic cover strips from product and dispose of correctly.

Sweep all metallic swarf and other debris from roof areas, gutters, downpipes, overflow devices and all other roof drainage components, at the end of each day and at the completion of the installation.

GUTTER MAINTENANCE

The roof drainage system (gutter, downpipes, overflow devices and all other components) must be cleaned out on a regular basis.

GUTTER MAINTENANCE

Getting the most from LYSAGHT® products

1) A typical suburban gutter clogged with leaf litter prior to cleaning.

2) Wear correct protection when clearing leaves and twigs.

3) When litter is removed, the layer of hardened dirt is revealed below.

4) Rinse the gutter with water to soften and break up the dirt.

5) Use a soft bristle brush and sweep the dirt out. Rinse again.

6) When the gutter has been cleaned, it should look like this.

CLEANING GUTTERS

Twigs, dust, leaves and fungal matter (debris) should be removed regularly from gutters - as failure to do so voids your warranty.

- Sweep debris into a pile using a stiff, soft bristled brush (shovels or hard tools should not be used).
- The whole roof and gutter should then be washed down with a hose, including high ends of gutters (possibly protected by overhangs), rain heads, water spouts and overflow locations.

A well maintained gutter/downpipe will make your rainwater system provide years and years of trouble-free service.

PRODUCT DESCRIPTIONS

- All descriptions, specifications, illustrations, drawings, data, dimensions and weights contained in this catalogue, all technical literature and websites containing information from Lysaght are approximations only. They are intended by Lysaght to be a general description for information and identification purposes and do not create a sale by description. Lysaght reserves the right at any time to:

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  (b) alter specifications shown in its promotional literature to reflect changes made after the date of such publication.

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- Terms and conditions of sale available at local Lysaght sales offices.
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FOR YOUR NEAREST SUPPLIER VISIT:

WWW.LYSAGHT.COM

FOR SALES ENQUIRIES CALL 13 30 38
FOR TECHNICAL ENQUIRIES CALL 1800 641 417

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