



*Product catalogue and specifiers design guide*

**ACO Building Drainage High Performance Rainwater Outlets for Flat Roofs, Car Park Gullies and Other Areas**

### ACO Building Drainage

Our built environment is becoming ever more complex. Applications are becoming more sophisticated and the increasing pressure of regulations and standards makes achieving design, performance and financial goals ever tougher.

Our mission: to eliminate design risk, to reduce installed and life cost and to deliver exceptional finish and performance in every product application.

Our global resources and manufacturing capacity make it possible for us to deliver best value, both with our standard products and with our bespoke designs. Confidence is further assured with quality systems that are in accordance with ISO 9001-2008.

ACO Building Drainage is a division of ACO Technologies plc and part of the worldwide ACO Group. The Group has sales in excess of £600 million worldwide with production facilities in the UK, Germany, France, Switzerland, Denmark, Spain, Poland, Czech Republic, Australia and the USA. In total more than 3900 people are employed in over 40 countries throughout the world.

#### ACO Building Drainage

##### Enquiries Team:

Tel: +44(0)1462 810421

Fax: +44(0)1462 851490

Email: [abdestimating@aco.co.uk](mailto:abdestimating@aco.co.uk)

- A complete pricing service to stockists, contractors and clients.

#### ACO Building Drainage

##### Customer Services Team:

Tel: +44(0)1462 810411

Fax: +44(0)1462 851490

Email: [abdcommercial@aco.co.uk](mailto:abdcommercial@aco.co.uk)

- Product availability, delivery lead times, and all other queries including collections, returns and product / service issues.

#### ACO Building Drainage

##### Design Services Team:

Tel: +44(0)1462 810431

Fax: +44(0)1462 851490

Email: [abdtechnical@aco.co.uk](mailto:abdtechnical@aco.co.uk)

- Technical and installation advice.
- Detailed design and 'Value Engineering' advice.
- Hydraulic calculations and AutoCAD drawings.
- Advice on the suitability of ACO equivalent products.

#### ACO Building Drainage

##### Marketing and Media Support

Tel: +44(0)1462 810400

Fax: +44(0)1462 851490

Email: [abdmarketing@aco.co.uk](mailto:abdmarketing@aco.co.uk)

- For all product brochures, imagery or merchandising material requests.



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- Roof / Balcony Drainage
- Wetroom & Shower Drainage



#### clean:

- Grease Management Systems



#### hold:

- Anti-flood Backflow Protection Systems



#### release:

- Lifting Stations\*

\*Available in 2015

#### Office address and contact details:

ACO Building Drainage  
ACO Business Centre  
Caxton Road  
Bedford  
Bedfordshire  
MK41 0LF

Tel: +44(0)1462 810400  
Fax: +44(0)1462 851490  
Email: [abdinfo@aco.co.uk](mailto:abdinfo@aco.co.uk)

Company Registration No: 1854115  
VAT No: GB 650 7977 05

[www.acobd.co.uk](http://www.acobd.co.uk)

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## System Overview

### Flat Roofs

The past few years have seen major advances and improvements in the materials used in modern roofing technology. A specifier now has renewed confidence to take full advantage of the benefits flat and low-pitched roof designs can offer.

Flat roofs provide opportunities for planning and design flexibility, for example; terracing, roof-top gardens, patios, car parks, delivery areas, building services and ventilation equipment and the ability to add additional storeys at a later date.

Large area roofs or irregular shaped buildings can be completed more quickly, easily and cost effectively than a pitched roof.

Flat roofs also allow easy access to natural light and because of the simple construction, internal partitioning is easy and particularly advantageous for commercial or industrial buildings.

### Materials

All ACO Building Drainage High Performance Rainwater Outlets are manufactured from die-cast marine-grade LM6 aluminium silicon alloy. This grade of aluminium alloy is highly corrosion resistant, weather-proof and resistant to ultra-violet radiation.

All cast components are polyester powder coated. For additional protection, this tough and resilient powder coated finish prevents natural galvanic corrosion in applications where dissimilar metals are dressed into the outlets. 304 stainless steel fixings are used to ensure long-service durability and reliability.

All ACO Building Drainage Rainwater Outlets are available in leaded gun metal to BS EN 1982:2008 to special order for lead or copper-clad roofs or connection to copper pipework.

ACO Building Drainage Car Park Gullies are manufactured from grey cast iron for robust and durable applications to accommodate heavy and frequent vehicle loads.

### Typical Applications

ACO Building Drainage High Performance Rainwater Outlets - page 8

- Flat roofs
- Low-pitched roofs
- Balconies
- Roof terraces

ACO Building Drainage Car Park Gullies - page 29

- Multi storey car parks
- Parking decks

### Standard References:

Design requirements and flow rate performance refer to EN 1253:2015 *Gullies for Buildings – Part 2: Roof drains and floor gullies without trap*.

Roof drainage layout and hydraulic calculations refer to BS EN 12056-3:2000 *Gravity drainage systems inside buildings – Part 3: Roof drainage, layout and calculation*.



High Performance (HP) outlets for a wide range of applications

Hydraulic Design

The following notes are intended as a guide to the specifier who is designing a rainwater drainage system for a roof. It is recommended to refer to BS EN 12056-3:2000 *Gravity drainage systems inside buildings – Part 3: Roof drainage, layout and calculation* for a comprehensive design guide.

For any rainwater drainage system to work effectively and reliably, it is recommended the specifier considers the following:

- Geographical location of the building
- Rainfall intensity
- Storm duration and return period
- Effective catchment area of roof
- Risk category of the building
- Hydraulic capacity of the drainage system(s) employed

Practical Design Tips

When designing an engineered rainwater scheme, the following design hints are suggested:

- Do not design for the maximum outlet hydraulic capacity. Allow a 10% factor of safety margin for intense storms and leaf/debris blockage.
- Always allow for a back-up outlet, even though only one outlet may be required.
- Rainwater outlets should be inspected and cleaned at least every 6 months to ensure reliable and continuous operation.

Geographical Location

Rainfall intensity has a direct impact on the performance requirements of any rainwater drainage system. For roofs and paved areas, it is normally impracticable to guard against very infrequent, extremely heavy rainfall situations so the designer should aim to strike a balance between the cost of the drainage system, the risk category of the building and the frequency and subsequent consequences of flooding in the advent of particularly high rainfall events.

The United Kingdom experiences complex and varied rainfall patterns, for example; although the upland areas of northern and western parts of the British Isles experience higher average annual rainfall than the lowland areas however, the lowland areas experience more frequent and more intense short duration rainfall than the upland areas. BS EN 12056-3:2000 provides further information and guidance on this topic.

A rainfall intensity of 75mm/hr (0.02083 l/s/m²) is used throughout this design catalogue.

Flow Rate Calculation

The runoff, or flow rate Q, from roofs, paved areas as surfaces is calculated as follows and assumes that all surfaces are impermeable:

$$Q = \frac{A \times I}{3600} \text{ litres/second}$$

where

Q = Volumetric flow rate (l/s)

A = Effective catchment area (m²)

I = Rainfall intensity (75mm/hr)

Alternatively,

$$Q = r \times A \text{ litres/second}$$

where

Q = Volumetric flow rate (l/s)

r = Rainfall intensity (l/s/m²)

A = Effective catchment area (m²)

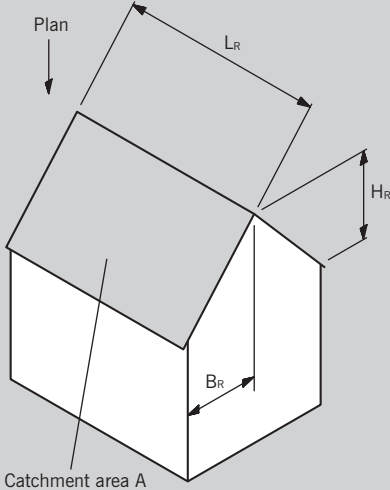
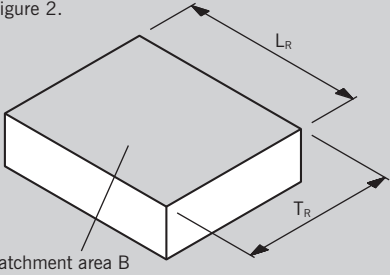
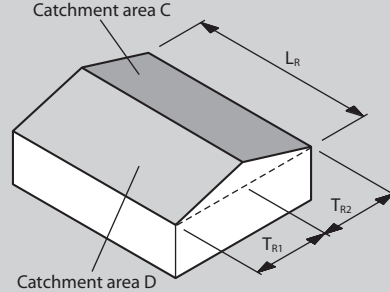
For reference, a rainfall intensity of 75mm/hr = 0.02083 l/s/m²

Note. Using either of the formulae above to calculate runoff (Q), for a given rainfall intensity and by knowing the flow rate performance of an individual rainwater outlet, the effective roof area drained can be calculated.

Flow rate performance and effective area drained are provided for each outlet contained in this catalogue.



Effective Catchment Area of Roofs

| Roof Type  | Diagram   | Catchment Area Calculation   |
|--|---|--|
| <p><b>Pitched roofs</b></p> <p>Taking into account the effects of wind driven rain, the effective area of a freely exposed pitched roof draining to an eaves gutter or parapet wall gutter is equal to the plan area of the roof plus half its maximum elevation area.</p> | <p>Figure 1.</p>   | <p>Catchment Area</p> $A = (B_R \times L_R) + H_R/2 \times L_R \text{ (m}^2\text{)}$ $= L_R(B_R \times H_R/2) \text{ (m}^2\text{)}$ <p>All dimensions in linear metres.</p>  |
| <p><b>Flat roofs &amp; paved areas</b></p> <p><b>Monopitch Flat Roof</b></p> <p>For a monopitch flat roof or paved area with a freely exposed horizontal surface, the effective catchment area is equal to the plan area of the area to be drained as shown below:</p>     | <p>Figure 2.</p>  | <p>Catchment Area</p> $B = L_R \times T_R \text{ (m}^2\text{)}$  |
| <p><b>Dual Pitch Flat Roof</b></p> <p>For a dual pitch flat roof, split the roof into discrete areas to isolate the catchment areas as shown:</p>  | <p>Figure 3.</p>  | <p>For a dual pitch flat roof, split the roof into discrete areas to isolate the catchment areas as shown:</p> <p>Catchment Area</p> $C = L_R \times T_{R2} \text{ (m}^2\text{)}$ <p>Catchment Area</p> $D = L_R \times T_{R1} \text{ (m}^2\text{)}$ <p>All dimensions in linear metres.</p> |

| Roof Type   | Diagram                           | Catchment Area Calculation  |
|---|-----------------------------------|---|
| <p><b>Adjacent vertical surfaces</b></p> <p>Flat roofs or paved areas that are adjacent to vertical walls and/or glazed surfaces will be subject to an increased hydraulic load due to the effects of wind driven rain against these vertical surfaces and subsequently running off onto the roof.</p> <p><b>Monopitch Flat Roof with One Adjacent Vertical Wall</b></p> <p>For a flat roof exposed to a single wall, assume the effective catchment areas to be half the exposed vertical area of the wall and is shown as follows:</p> <p><b>Monopitch Flat Roof with Two Adjacent Vertical Walls</b></p> <p>Similarly, for a flat roof exposed to two or more vertical walls forming an angle or bay, the assumed resulting wind direction requires that the combined areas of the walls should be considered together as follows:</p> | <p>Figure 4.</p> <p>Figure 5.</p> | <p>Catchment Area B = <math>L_R \times T_R</math> (m<sup>2</sup>)</p> <p>Catchment Area E = <math>L_R \times H/2</math> (m<sup>2</sup>)</p> <p>Total Catchment Area = <math>(L_R \times T_R) + (L_R \times H/2)</math> (m<sup>2</sup>)</p> <p>All dimensions in linear metres.</p> <p>Catchment Area B = <math>L_R \times T_R</math> (m<sup>2</sup>)</p> <p>Catchment Area E = <math>L_R \times H/2</math> (m<sup>2</sup>)</p> <p>Catchment Area F = <math>T_R \times h/2</math> (m<sup>2</sup>)</p> <p>Total Catchment Area = <math>(L_R \times T_R) + \frac{1}{2}\sqrt{(E^2 + F^2 - 2F \times \cos \Theta)}</math> (m<sup>2</sup>)</p> <p>All dimensions in linear metres; angles in degrees.</p> |



## Product range overview

### ACO HP vertical spigot outlet



General purpose rainwater outlets suitable for convenient direct connection to PVC-U 'O'-ring socket pipe to BS 4514:2001 or to cast iron pipework to BS 416:1990 or BS EN 877: 1999. Other connections can be made using an appropriate flexible coupling or heat shrink sleeving.

Vertical spigot outlets are available with either domed or flat gratings. Flat gratings are used where either vehicles or pedestrian traffic is likely.

### ACO HP two-way screw outlet



The two-way outlet is designed to be used at the junction of roofs and parapet walls, or wherever horizontal and vertical surfaces meet. This flexible design of outlet allows either a horizontal or vertical outflow take-off. Pipework connections as for vertical screw details.

### ACO HP 45° & 90° outlets



These angled problem solving outlets are particularly relevant to suit more complex pipe run detail. Pipework connections as spigot or screwed outlets.

### ACO HP vertical screw outlet



Screwed outlets are recommended where connection to the outlet occurs within the thickness of the slab and threaded connections will form a completely gas-tight seal.

Vertical screw outlets have a female parallel thread to BS 21:1985 for connecting directly to pipes conforming to BS EN 10226:2005. This ensures a completely watertight seal when screwed home into the outlet body.

A range of ABS threaded adaptors are available from ACO Building Drainage to allow connection to PVC-U, socketless cast iron and aluminium rainwater pipes.

### ACO HP balcony spigot outlet



The balcony outlet provides discrete safe drainage for balconies and walkways. Supplied complete with a 'D'-shaped flat grating, the outlet can be installed directly against a wall. The grating is supplied with suitable apertures to accommodate 50mm, 75mm or 100mm nominal bore rainwater downpipes, easily cut on site to suit the application.

### ACO HP Refurbishment outlet

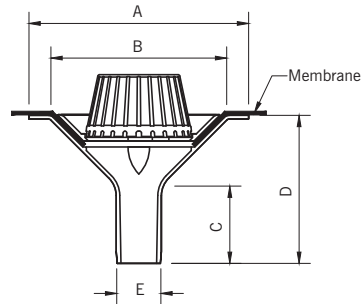


When an existing flat roof is being upgraded, the refurbishment outlet is designed to fit inside the existing outlet and pipework with minimal disruption without the need to remove the original unit or pipework.

Outlets are supplied with a flexible finned pipe seal ensuring a watertight connection to existing pipework. The ease of use and minimal disruption to the existing rainwater system makes this an extremely cost effective solution when upgrading flat roofs.



## ACO HP Vertical Spigot Outlet – Dome Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105900  | 50HP-D      | 50                          | 60           | 82                 | 1.7              | 2.50        |
| 105901  | 75HP-D      | 75                          | 83           | 240                | 5.0              | 2.40        |
| 105902  | 100HP-D     | 100                         | 110          | 514                | 10.7             | 3.10        |
| 105903  | 150HP-D     | 150                         | 160          | 725                | 15.1             | 3.60        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C   | D   | E   |
| 105900  | 50HP-D      | 50                     | 300                     | 260 | 105 | 200 | 60  |
| 105901  | 75HP-D      | 75                     | 300                     | 260 | 110 | 200 | 83  |
| 105902  | 100HP-D     | 100                    | 380                     | 310 | 130 | 240 | 110 |
| 105903  | 150HP-D     | 150                    | 380                     | 310 | 160 | 240 | 160 |

### Pipework connections

Vertical spigot outlets may be directly connected to the following:

- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
- PVC-U 'O'-ring socketed pipe to BS 4514:2001 (for 75HP-D, 100HP-D and 150HP-D outlets only).
- Connection to 50HP-D outlets via pipe couplings or heat shrink socket.

### Specification clause

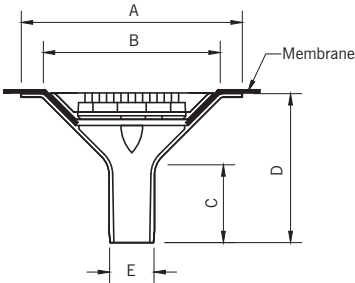
The rainwater outlets 50HP-D/75HP-D/100HP-D/150HP-D\* are to be ACO Building Drainage HP vertical spigot outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

ACO HP Vertical Spigot Outlet – Flat Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105904  | 50HP-F      | 50                          | 60           | 82                 | 1.7              | 2.80        |
| 105905  | 75HP-F      | 75                          | 83           | 240                | 5.0              | 2.70        |
| 105906  | 100HP-F     | 100                         | 110          | 514                | 10.7             | 3.80        |
| 105907  | 150HP-F     | 150                         | 160          | 787                | 16.4             | 4.20        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C   | D   | E   |
| 105904  | 50HP-F      | 50                     | 300                     | 260 | 105 | 200 | 60  |
| 105905  | 75HP-F      | 75                     | 300                     | 260 | 110 | 200 | 83  |
| 105906  | 100HP-F     | 100                    | 380                     | 310 | 130 | 240 | 110 |
| 105907  | 150HP-F     | 150                    | 380                     | 310 | 160 | 240 | 160 |

Pipework connections

- Vertical spigot outlets may be directly connected to the following:
- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
  - PVC-U 'O'-ring socketed pipe to BS 4514:2001 (for 75HP-F, 100HP-F and 150HP-F outlets only).
  - Connection to 50HP-F outlets via pipe couplings or heat shrink socket.

Specification clause

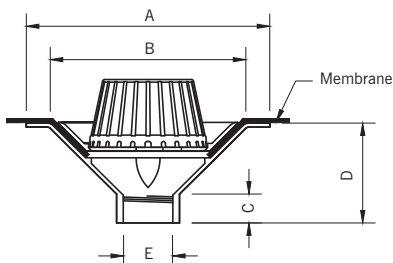
The rainwater outlets 50HP-F/75HP-F/100HP-F/150HP-F\* are to be ACO Building Drainage HP vertical spigot outlets with locked flat grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

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All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

## ACO HP Vertical Screw Outlet – Dome Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|------------------|-------------|
| 105908  | 50HP-TD     | 50                          | 82                 | 1.7              | 2.20        |
| 105909  | 75HP-TD     | 75                          | 240                | 5.0              | 2.30        |
| 105910  | 100HP-TD    | 100                         | 514                | 10.7             | 3.00        |
| 105911  | 150HP-TD    | 150                         | 730                | 15.2             | 3.10        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |    |     |        |
|---------|-------------|------------------------|-------------------------|-----|----|-----|--------|
|         |             |                        | A                       | B   | C  | D   | E      |
| 105908  | 50HP-TD     | 50                     | 300                     | 260 | 45 | 130 | 2" BSP |
| 105909  | 75HP-TD     | 75                     | 300                     | 260 | 45 | 130 | 3" BSP |
| 105910  | 100HP-TD    | 100                    | 380                     | 310 | 45 | 130 | 4" BSP |
| 105911  | 150HP-TD    | 150                    | 380                     | 310 | 45 | 130 | 6" BSP |

See Page 27 for ABS threaded adaptors

### Pipework connections

ACO threaded outlets are supplied with a parallel female screw thread to BS 21: 1985 for connection to tube conforming to BS EN 10255:2004 with male taper thread to BS 21:1985. This ensures a completely watertight seal when screwed fully home into the outlet body. Threaded outlets are recommended where connection to the outlet occurs within the thickness of the slab as threaded connections will form a completely gas-tight seal within the slab.

### Specification clause

The rainwater outlets 50HP-TD/75HP-TD/100HP-TD/150HP-TD\* are to be ACO Building Drainage HP vertical threaded outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

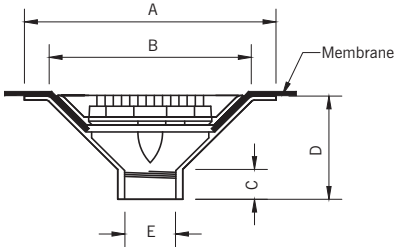
All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.



ACO HP Vertical Screw Outlet – Flat Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|------------------|-------------|
| 105912  | 50HP-TF     | 50                          | 82                 | 1.7              | 2.50        |
| 105913  | 75HP-TF     | 75                          | 240                | 5.0              | 2.50        |
| 105914  | 100HP-TF    | 100                         | 514                | 10.7             | 3.70        |
| 105915  | 150HP-TF    | 150                         | 736                | 15.9             | 3.80        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |    |     |        |
|---------|-------------|------------------------|-------------------------|-----|----|-----|--------|
|         |             |                        | A                       | B   | C  | D   | E      |
| 105912  | 50HP-TF     | 50                     | 300                     | 260 | 45 | 130 | 2" BSP |
| 105913  | 75HP-TF     | 75                     | 300                     | 260 | 45 | 130 | 3" BSP |
| 105914  | 100HP-TF    | 100                    | 380                     | 310 | 45 | 130 | 4" BSP |
| 105915  | 150HP-TF    | 150                    | 380                     | 310 | 45 | 130 | 6" BSP |

See Page 27 for ABS threaded adaptors

Pipework connections

ACO threaded outlets are supplied with a parallel female screw thread to BS 21: 1985 for connection to tube conforming to BS EN 10255:2004 with male taper thread to BS 21:1985. This ensures a completely watertight seal when screwed fully home into the outlet body. Threaded outlets are recommended where connection to the outlet occurs within the thickness of the slab as threaded connections will form a completely gas-tight seal within the slab.

Specification clause

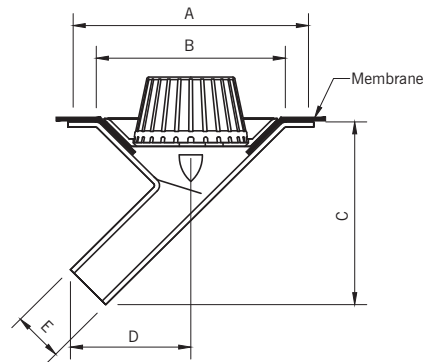
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\* please delete or complete as appropriate.

## ACO HP 45° Spigot Outlet – Dome Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105916  | 50/45HP-D   | 50                          | 60           | 82                 | 1.7              | 2.90        |
| 105917  | 75/45HP-D   | 75                          | 83           | 240                | 5.0              | 3.50        |
| 105918  | 100/45HP-D  | 100                         | 110          | 422                | 8.8              | 5.00        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C   | D   | E   |
| 105916  | 50/45HP-D   | 50                     | 300                     | 260 | 245 | 135 | 60  |
| 105917  | 75/45HP-D   | 75                     | 300                     | 260 | 260 | 160 | 83  |
| 105918  | 100/45HP-D  | 100                    | 380                     | 310 | 275 | 200 | 110 |

### Pipework connections

45° spigot outlets may be directly connected to the following:

- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
- PVC-U 'O'-ring socketed pipe to BS 4514:2001 (for 75/45HP-D, and 100/45HP-D outlets only).
- Connection to 50/45HP-D outlets via pipe couplings or heat shrink socket.

### Specification clause

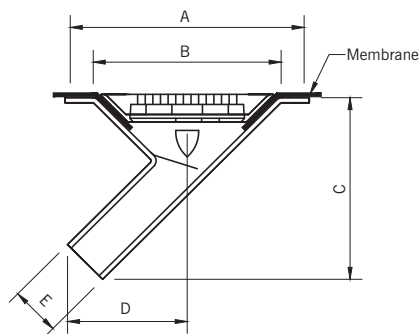
The rainwater outlets 50/45HP-D/75/45HP-D/100/45HP-D\* are to be ACO Building Drainage HP 45° spigot outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

## ACO HP 45° Spigot Outlet – Flat Grate



**NEW!**

| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105919  | 50/45HP-F   | 50                          | 60           | 82                 | 1.7              | 3.60        |
| 105920  | 75/45HP-F   | 75                          | 83           | 240                | 5.0              | 4.00        |
| 105921  | 100/45HP-F  | 100                         | 110          | 494                | 10.3             | 6.20        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C   | D   | E   |
| 105919  | 50/45HP-F   | 50                     | 300                     | 260 | 245 | 135 | 60  |
| 105920  | 75/45HP-F   | 75                     | 300                     | 260 | 260 | 160 | 83  |
| 105921  | 100/45HP-F  | 100                    | 380                     | 310 | 275 | 200 | 110 |

### Pipework connections

45° spigot outlets may be directly connected to the following:

- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
- PVC-U 'O'-ring socketed pipe to BS 4514:2001 (for 75/45HP-F and 100/45HP-F outlets only).
- Connection to 50/45HP-F outlets via pipe couplings or heat shrink socket.

### Specification clause

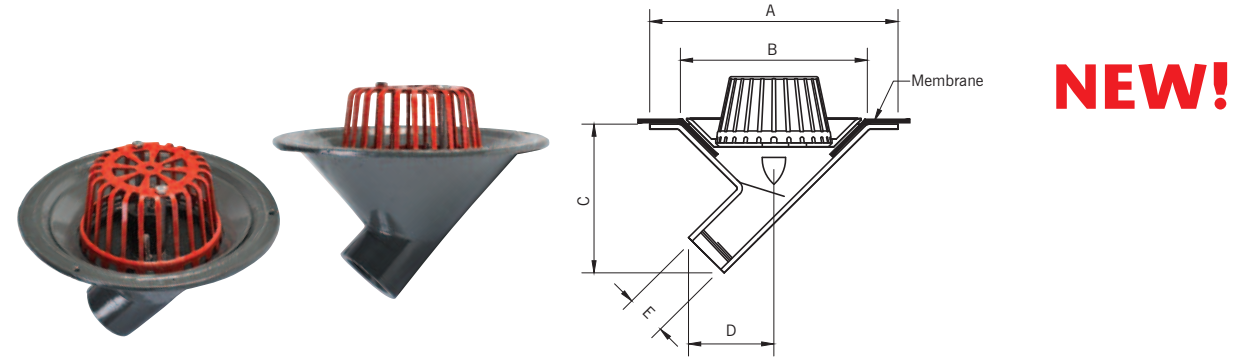
The rainwater outlets 50/45HP-F/75/45HP-F/100/45HP-F\* are to be ACO Building Drainage HP 45° spigot outlets with locked flat grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

ACO HP 45° Screw Outlet – Dome Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|------------------|-------------|
| 105922  | 50/45HP-TD  | 50                          | 82                 | 1.7              | 3.10        |
| 105923  | 75/45HP-TD  | 75                          | 240                | 5.0              | 2.60        |
| 105924  | 100/45HP-TD | 100                         | 418                | 8.7              | 4.40        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |        |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|--------|
|         |             |                        | A                       | B   | C   | D   | E      |
| 105922  | 50/45HP-TD  | 50                     | 300                     | 260 | 190 | 80  | 2" BSP |
| 105923  | 75/45HP-TD  | 75                     | 300                     | 260 | 200 | 120 | 3" BSP |
| 105924  | 100/45HP-TD | 100                    | 380                     | 310 | 210 | 145 | 4" BSP |

See Page 27 for ABS threaded adaptors

Pipework connections

ACO threaded outlets are supplied with a parallel female screw thread to BS 21: 1985 for connection to tube conforming to BS EN 10255:2004 with male taper thread to BS 21:1985. This ensures a completely watertight seal when screwed fully home into the outlet body. Threaded outlets are recommended where connection to the outlet occurs within the thickness of the slab as threaded connections will form a completely gas-tight seal within the slab.

Specification clause

The rainwater outlets 50/45HP-TD/75/45HP-TD/100/45HP-TD\* are to be ACO Building Drainage HP 45° threaded outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

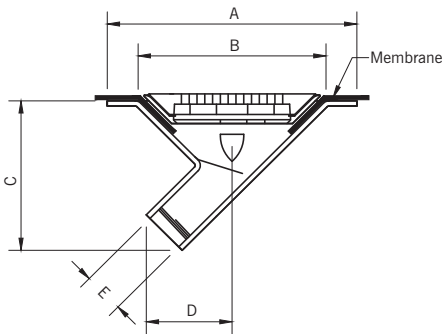
All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.





ACO HP 45° Screw Outlet – Flat Grate



NEW!

| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|------------------|-------------|
| 105925  | 50/45HP-TF  | 50                          | 1.7                | 82               | 3.50        |
| 105926  | 75/45HP-TF  | 75                          | 5.0                | 240              | 3.60        |
| 105927  | 100/45HP-TF | 100                         | 8.7                | 485              | 5.10        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |        |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|--------|
|         |             |                        | A                       | B   | C   | D   | E      |
| 105925  | 50/45HP-TF  | 50                     | 300                     | 260 | 190 | 80  | 2" BSP |
| 105926  | 75/45HP-TF  | 75                     | 300                     | 260 | 200 | 120 | 3" BSP |
| 105927  | 100/45HP-TF | 100                    | 380                     | 310 | 210 | 145 | 4" BSP |

See Page 27 for ABS threaded adaptors

Pipework connections

ACO threaded outlets are supplied with a parallel female screw thread to BS 21: 1985 for connection to tube conforming to BS EN 10255:2004 with male taper thread to BS 21:1985. This ensures a completely watertight seal when screwed fully home into the outlet body. Threaded outlets are recommended where connection to the outlet occurs within the thickness of the slab as threaded connections will form a completely gas-tight seal within the slab.

Specification clause

The rainwater outlets 50/45HP-TF/75/45HP-TF/100/45HP-TF\* are to be ACO Building Drainage HP 45° threaded outlets with locked flat grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

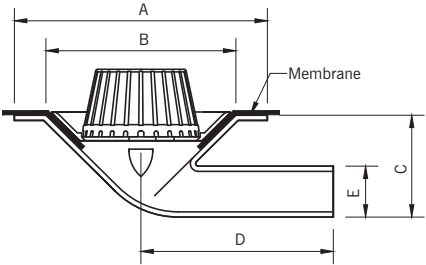
All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

ACO HP 90° Spigot Outlet – Dome Grate

NEW!



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105928  | 50/90HP-D   | 50                          | 60           | 82                 | 1.7              | 3.00        |
| 105929  | 75/90HP-D   | 75                          | 83           | 240                | 5.0              | 3.00        |
| 105930  | 100/90HP-D  | 100                         | 110          | 346                | 7.2              | 5.10        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C   | D   | E   |
| 105928  | 50/90HP-D   | 50                     | 300                     | 260 | 130 | 230 | 60  |
| 105929  | 75/90HP-D   | 75                     | 300                     | 260 | 130 | 230 | 83  |
| 105930  | 100/90HP-D  | 100                    | 380                     | 310 | 160 | 290 | 110 |

Pipework connections

90° spigot outlets may be directly connected to the following:

- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
- PVC-U 'O'-ring socketed pipe to BS 4514:2001 (for 75/90HP-D and 100/90HP-D outlets only).
- Connection to 50/90HP-D outlets via pipe couplings or heat shrink socket.

Specification clause

The rainwater outlets 50/90HP-D/75/90HP-D/100/90HP-D\* are to be ACO Building Drainage HP 90° spigot outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

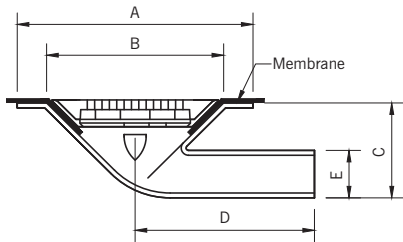
All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010..

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

ACO HP 90° Spigot Outlet – Flat Grate

NEW!



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105931  | 50/90HP-F   | 50                          | 60           | 82                 | 1.7              | 3.30        |
| 105932  | 75/90HP-F   | 75                          | 83           | 192                | 4.0              | 3.40        |
| 105933  | 100/90HP-F  | 100                         | 110          | 398                | 8.3              | 6.00        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C   | D   | E   |
| 105931  | 50/90HP-F   | 50                     | 300                     | 260 | 130 | 230 | 60  |
| 105932  | 75/90HP-F   | 75                     | 300                     | 260 | 130 | 230 | 83  |
| 105933  | 100/90HP-F  | 100                    | 380                     | 310 | 160 | 290 | 110 |

Pipework connections

90° spigot outlets may be directly connected to the following:

- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
- PVC-U 'O'-ring socketed pipe to BS 4514:2001 (for 75/90HP-F and 100/90HP-F outlets only).
- Connection to 50/90HP-F outlets via pipe couplings or heat shrink socket.

Specification clause

The rainwater outlets 50/90HP-F/75/90HP-F/100/90HP-F\* are to be ACO Building Drainage HP 90° spigot outlets with locked flat grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

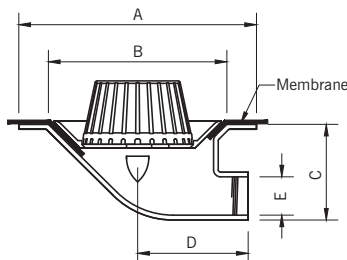
All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

## ACO HP 90° Screw Outlet – Dome Grate

**NEW!**



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|------------------|-------------|
| 105934  | 50/90HP-TD  | 50                          | 82                 | 1.7              | 2.90        |
| 105935  | 75/90HP-TD  | 75                          | 182                | 3.8              | 2.90        |
| 105936  | 100/90HP-TD | 100                         | 341                | 7.1              | 4.70        |
| 105937  | 150/90HP-TD | 150                         | 507                | 10.6             | 4.90        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |        |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|--------|
|         |             |                        | A                       | B   | C   | D   | E      |
| 105934  | 50/90HP-TD  | 50                     | 300                     | 260 | 130 | 160 | 2" BSP |
| 105935  | 75/90HP-TD  | 75                     | 300                     | 260 | 130 | 160 | 3" BSP |
| 105936  | 100/90HP-TD | 100                    | 380                     | 310 | 170 | 190 | 4" BSP |
| 105937  | 150/90HP-TD | 150                    | 380                     | 310 | 215 | 140 | 6" BSP |

See Page 27 for ABS threaded adaptors

### Pipework connections

ACO threaded outlets are supplied with a parallel female screw thread to BS 21: 1985 for connection to tube conforming to BS EN 10255:2004 with male taper thread to BS 21:1985. This ensures a completely watertight seal when screwed fully home into the outlet body. Threaded outlets are recommended where connection to the outlet occurs within the thickness of the slab as threaded connections will form a completely gas-tight seal within the slab.

### Specification clause

The rainwater outlets 50/90 HP-TD/75/90HP-TD/100/90 HP-TD/150/90 HP-TD\* are to be ACO Building Drainage HP 90° threaded outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

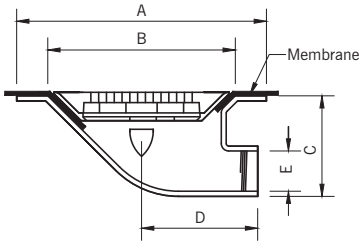
All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.



ACO HP 90° Screw Outlet – Flat Grate

NEW!



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|------------------|-------------|
| 105938  | 50/90HP-TF  | 50                          | 82                 | 1.7              | 3.30        |
| 105939  | 75/90HP-TF  | 75                          | 197                | 4.1              | 3.20        |
| 105940  | 100/90HP-TF | 100                         | 389                | 8.1              | 5.50        |
| 105941  | 150/90HP-TF | 150                         | 624                | 13.0             | 5.00        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |        |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|--------|
|         |             |                        | A                       | B   | C   | D   | E      |
| 105938  | 50/90HP-TF  | 50                     | 300                     | 260 | 130 | 160 | 2" BSP |
| 105939  | 75/90HP-TF  | 75                     | 300                     | 260 | 130 | 160 | 3" BSP |
| 105940  | 100/90HP-TF | 100                    | 380                     | 310 | 170 | 190 | 4" BSP |
| 105941  | 150/90HP-TF | 150                    | 380                     | 310 | 215 | 140 | 6" BSP |

See Page 27 for ABS threaded adaptors

Pipework connections

ACO threaded outlets are supplied with a parallel female screw thread to BS 21: 1985 for connection to tube conforming to BS EN 10255:2004 with male taper thread to BS 21:1985. This ensures a completely watertight seal when screwed fully home into the outlet body. Threaded outlets are recommended where connection to the outlet occurs within the thickness of the slab as threaded connections will form a completely gas-tight seal within the slab.

Specification clause

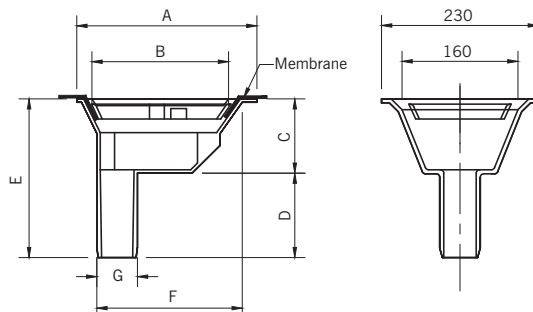
The rainwater outlets 50/90HP-TF/75/90HP-TF/100/90HP-TF/150/90HP-TF\* are to be ACO Building Drainage HP 90° threaded outlets with locked flat grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

## ACO HP Balcony Spigot Outlet – Flat Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105942  | 50HP-BO     | 50                          | 60           | 82                 | 1.7              | 2.60        |
| 105943  | 75HP-BO     | 75                          | 83           | 240                | 5.0              | 2.60        |
| 105944  | 100HP-BO    | 100                         | 110          | 345                | 7.6              | 2.80        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |    |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|----|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C  | D   | E   | F   | G   |
| 105942  | 50HP-BO     | 50                     | 265                     | 205 | 90 | 125 | 215 | 210 | 60  |
| 105943  | 75HP-BO     | 75                     | 265                     | 205 | 90 | 125 | 215 | 210 | 83  |
| 105944  | 100HP-BO    | 100                    | 265                     | 205 | 90 | 125 | 215 | 210 | 110 |

### Pipework connections

Vertical spigot outlets may be directly connected to the following:

- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
- PVC-U 'O'-ring socketed pipe to BS 4514:2001 (for 75HP-BO and 100HP-BO outlets only).
- Connection to 50HP-BO outlets via pipe couplings or heat shrink socket.

### Specification clause

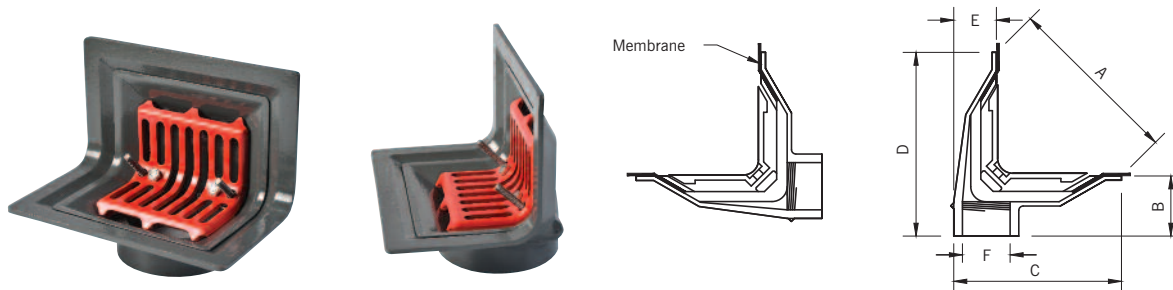
The rainwater outlets 50HP-BO/75HP-BO/100HP-BO\* are to be ACO Building Drainage HP vertical spigot outlets with locked flat grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

## ACO HP Two-Way Screw Outlet – Flat Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) |                    | Flow Rate† (l/s) |                    | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|--------------------|------------------|--------------------|-------------|
|         |             |                             | Vertical Outflow   | Horizontal Outflow | Vertical Outflow | Horizontal Outflow |             |
| 105945  | 50HP-TW     | 50                          | 82                 | 58                 | 1.7              | 1.7                | 2.10        |
| 105946  | 75HP-TW     | 75                          | 197                | 96                 | 4.1              | 2.0                | 2.20        |
| 105947  | 100HP-TW    | 100                         | 374                | 114                | 7.8              | 2.4                | 2.20        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |    |     |     |    |        |
|---------|-------------|------------------------|-------------------------|----|-----|-----|----|--------|
|         |             |                        | A                       | B  | C   | D   | E  | F      |
| 105945  | 50HP-TW     | 50                     | 202                     | 70 | 193 | 213 | 50 | 2" BSP |
| 105946  | 75HP-TW     | 75                     | 202                     | 70 | 193 | 213 | 50 | 3" BSP |
| 105947  | 100HP-TW    | 100                    | 202                     | 70 | 193 | 213 | 50 | 4" BSP |

See Page 27 for ABS threaded adaptors

### Pipework connections

ACO threaded outlets are supplied with a parallel female screw thread to BS 21: 1985 for connection to tube conforming to BS EN 10255:2004 with male taper thread to BS 21:1985. This ensures a completely watertight seal when screwed fully home into the outlet body. Threaded outlets are recommended where connection to the outlet occurs within the thickness of the slab as threaded connections will form a completely gas-tight seal within the slab.

### Specification clause

The rainwater outlets 50HP-TW/75HP-TW/100HP-TW\* are to be ACO Building Drainage HP threaded outlets with locked grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

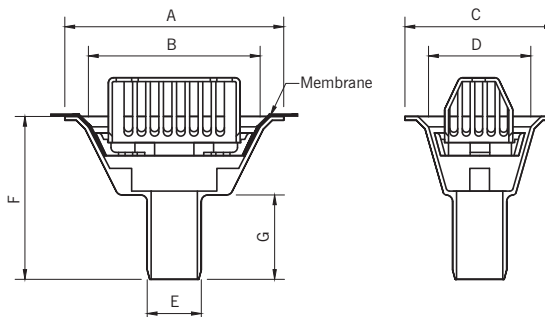
All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.



## ACO HP Gully Spigot Outlet – Dome Grate



| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Pipe OD (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------|--------------------|------------------|-------------|
| 105948  | 75HP-GO     | 75                          | 80           | 240                | 5.0              | 3.10        |
| 105949  | 100HP-GO    | 100                         | 110          | 514                | 10.7             | 3.40        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.

† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.

‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |     |     |     |     |     |
|---------|-------------|------------------------|-------------------------|-----|-----|-----|-----|-----|-----|
|         |             |                        | A                       | B   | C   | D   | E   | F   | G   |
| 105948  | 75HP-GO     | 75                     | 345                     | 260 | 240 | 160 | 80  | 230 | 125 |
| 105949  | 100HP-GO    | 100                    | 345                     | 260 | 240 | 160 | 110 | 230 | 125 |

### Pipework connections

Vertical spigot outlets may be directly connected to the following:

- Cast iron pipework to BS 416:1990 or BS EN 877 :1999.
- PVC-U 'O'-ring socketed pipe to BS 4514:2001.

### Specification clause

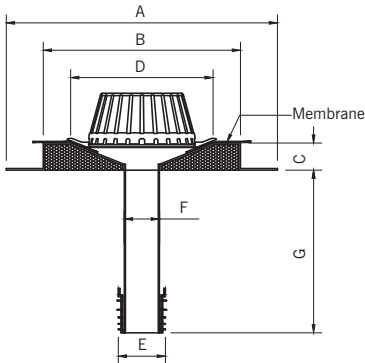
The rainwater outlets 75HP-GO/100HP-GO\* are to be ACO Building Drainage HP vertical spigot outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

ACO HP Gully Refurbishment Outlet – Dome Grate



NEW!

| Part No | Product Ref | Nominal Bore Pipe Size (mm) | Area Drained‡ (m²) | Flow Rate† (l/s) | Weight (kg) |
|---------|-------------|-----------------------------|--------------------|------------------|-------------|
| 105950  | 75HP-RFO    | 75                          | 240                | 5.0              | 7.70        |
| 105951  | 100HP-RFO   | 100                         | 240                | 5.0              | 8.20        |

† Actual flow rate through outlets may be significantly higher but stated capacity limited to conform to BS EN 12056-3:2000 to prevent siphonic action for gravity rainwater drainage systems.  
† Flow rate measured at 35mm head of water over outlet body for outlets up to 110mm diameter and 45mm head for 160mm diameter outlets as per EN 1253-2:2015.  
‡ Based on a rainfall intensity of 75mm/hr (0.02083 l/s/m²).

| Part No | Product Ref | Nominal bore pipe size | Product Dimensions (mm) |     |    |     |     |    |     |
|---------|-------------|------------------------|-------------------------|-----|----|-----|-----|----|-----|
|         |             |                        | A                       | B   | C  | D   | E   | F  | G   |
| 105950  | 75HP-RFO    | 75                     | 494                     | 354 | 50 | 236 | 89  | 64 | 285 |
| 105951  | 100HP-RFO   | 100                    | 494                     | 354 | 50 | 236 | 114 | 89 | 285 |

Pipework connections

Refurbishment outlets are designed to fit the following range of existing pipework systems:

- 75HP-RFO : 71.5 to 78.5mm internal diameter.
- 100HP-RFO : 97.0 to 104.0 mm diameter.

Specification clause

The rainwater outlets 75HP-RFO/100HP-RFO\* are to be ACO Building Drainage HP vertical spigot outlets with locked dome grating supplied by ACO Building Drainage (a division of ACO Technologies plc), ACO Business Centre, Caxton Road, Bedford MK41 0LF.

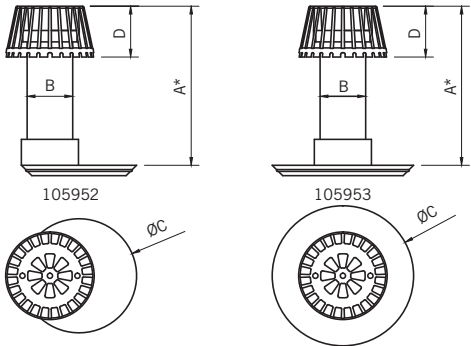
All components to be manufactured from grade LM6 aluminium silicon alloy to BS EN 1706:2010.

All components used within the scope of this system are shown on Drawing No. \* and all work shall be carried out strictly in accordance with the manufacturer's instructions and the installation details are set out on Drawing No. \*.

\* please delete or complete as appropriate.

ACO HP Overflow Outlet Module – Dome Grate

NEW!



| Part No | Product Ref  | Nominal Bore Pipe Size (mm) | Flow Rate† (l/s) | Weight (kg) |
|---------|--------------|-----------------------------|------------------|-------------|
| 105952  | 50/75HP-OF   | 50                          | 2.4              | 2.20        |
| 105953  | 100/150HP-OF | 75                          | 2.4              | 2.70        |

† 35mm head of water over outlet

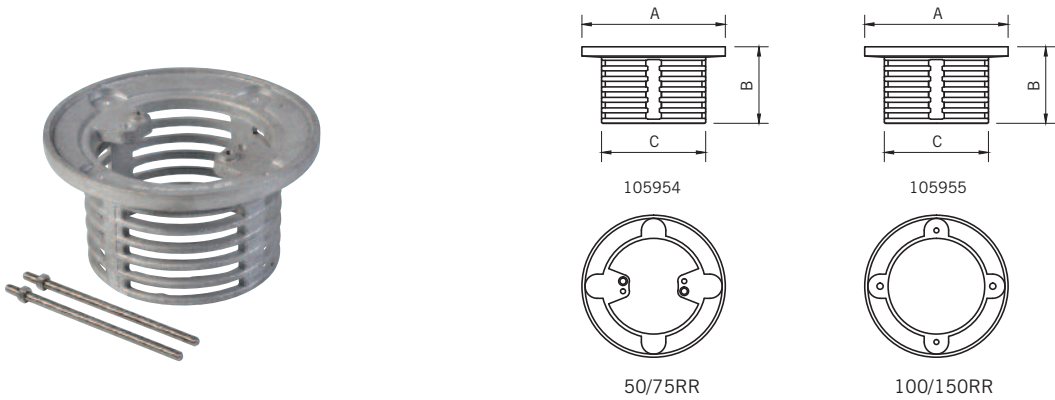
\* Easy cut on site to suit application.

| Part No | Product Ref  | Nominal bore pipe size | Product Dimensions (mm) |    |     |    |
|---------|--------------|------------------------|-------------------------|----|-----|----|
|         |              |                        | A                       | B  | C   | D  |
| 105952  | 50/75HP-OF   | 75                     | 310                     | 90 | 215 | 95 |
| 105953  | 100/150HP-OF | 100                    | 310                     | 90 | 273 | 95 |

Overflow modules are easily attached to an appropriate circular 50/75HP or 100/150HP rainwater outlets in applications where grating blockage from leaves, for example, would lead to an excessive accumulation of water on the roof area. Unplanned excess water on the roof area can lead to over-spill to the sides of the building and significantly increase the load applied to the roof structure.

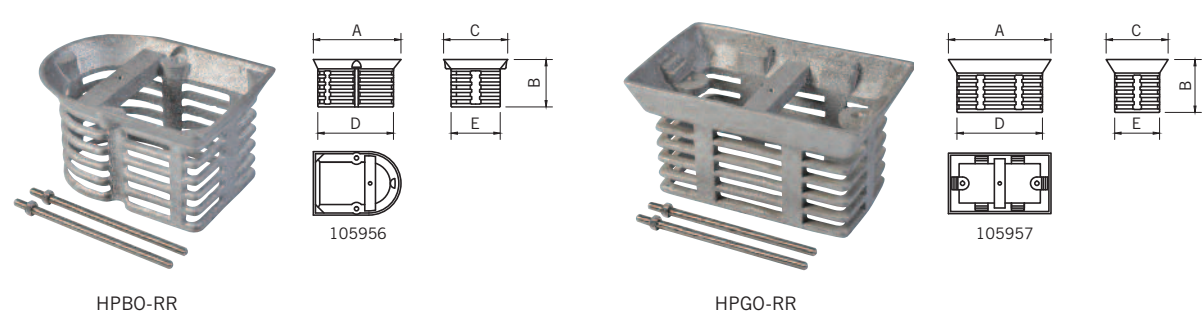
Overflow units are supplied with a PVC tube 250mm long that can be easily cut on site to the maximum permissible overflow height required for the application. Overflow units are used in conjunction with an appropriate spigot outlet unit.

ACO Raising Rings for Circular Outlets



| Part No | Product Ref | Suitable for Outlet Product Ref  | Product Dimensions (mm) |     |     | Weight (kg) |
|---------|-------------|--|-------------------------|-----|-----|-------------|
|         |             |  | A                       | B   | C   |             |
| 105954  | 50/75RR     | 50HP-D; 75HP-D; 50HP-F; 75HP-F; 50HP-TD; 75HP-TD; 50HP-TF; 75HP-TF; 50/45HP-D; 75/45HP-D; 50/45HP-F; 75/45HP-F; 50/45HP-TD; 75/45HP-TD; 50/45HP-TF; 75/45HP-TF; 50/90HP-D; 75/90HP-D; 50/90HP-F; 75/90HP-F; 50/90HP-TD; 75/90HP-TD; 50/90HP-TF; 75/90HP-TF                         | 230                     | 125 | 170 | 1.50        |
| 105955  | 100/150RR   | 100HP-D; 150HP-D; 100HP-F; 150HP-F; 100HP-TD; 150HP-TD; 100HP-TF; 150HP-TF; 100/45HP-D; 150/45HP-D; 100/45HP-F; 150/45HP-F; 100/45HP-TD; 150/45HP-TD; 100/45HP-TF; 150/45HP-TF; 100/90HP-D; 150/90HP-D; 100/90HP-F; 150/90HP-F; 100/90HP-TD; 150/90HP-TD; 100/90HP-TF; 150/90HP-TF | 230                     | 125 | 170 | 1.40        |

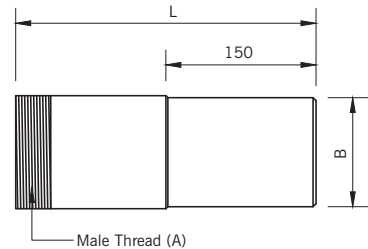
ACO Raising Rings for Balcony and Gully Outlets



| Part No | Product Ref | Suitable for Outlet Product Ref | Product Dimensions (mm) |     |     |     |     | Weight (kg) |
|---------|-------------|---------------------------------|-------------------------|-----|-----|-----|-----|-------------|
|         |             |                                 | A                       | B   | C   | D   | E   |             |
| 105956  | HPBO-RR     | 50HP-BO; 75HP-BO; 100HP-BO      | 207                     | 117 | 150 | 177 | 115 | 0.80        |
| 105957  | HPGO-RR     | 75HP-GO; 100HP-GO               | 240                     | 125 | 145 | 200 | 105 | 1.60        |

ACO ABS Threaded Adaptors

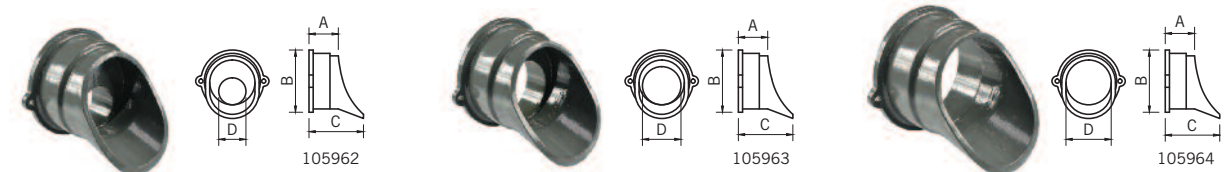
For use with ACO Building Drainage Screw Rainwater Outlets.



| Part No | Product Ref | Male Thread A (BSP) | Spigot Dia B (mm) | Length L (mm) | Weight (kg) |
|---------|-------------|---------------------|-------------------|---------------|-------------|
| 105958  | 50STC       | 2"                  | 55                | 300           | 0.30        |
| 105959  | 75STC       | 3"                  | 83                | 300           | 0.60        |
| 105960  | 100STC      | 4"                  | 110               | 300           | 1.00        |
| 105961  | 150STC      | 6"                  | 160               | 300           | 1.60        |

ACO Discharge Spouts

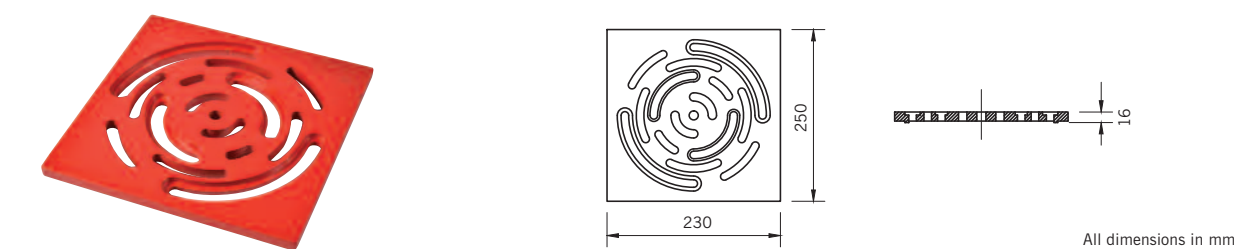
Discharge spouts provide a convenient and aesthetically pleasing finishing detail to attach to a parapet/vertical wall outlet pipe. Manufactured from LM6 aluminium silicon alloy they can be directly connected to ACO Building Drainage ABS Threaded Adaptors with a watertight seal and secured to the vertical wall using two fixing lugs. Discharge spout projection from the vertical wall's: 40mm.



| Part No | Product Ref | Product Dimensions (mm) |     |     |     | Weight (kg) |
|---------|-------------|-------------------------|-----|-----|-----|-------------|
|         |             | A                       | B   | C   | D   |             |
| 105962  | 50HP-SPOUT  | 75                      | 150 | 135 | 64  | 1.20        |
| 105963  | 75HP-SPOUT  | 75                      | 150 | 135 | 92  | 1.10        |
| 105964  | 100HP-SPOUT | 75                      | 150 | 135 | 118 | 0.90        |

ACO Terrace Grate for Circular Outlet Raising Rings

Terrace grates are designed for installations with terraced paving slabs or block paviors. Terrace grates can only be used with raising rings for circular outlets as shown on Page 26. A slotted fixing detail allows 90° rotational movement to accommodate slab/pavior patterns.

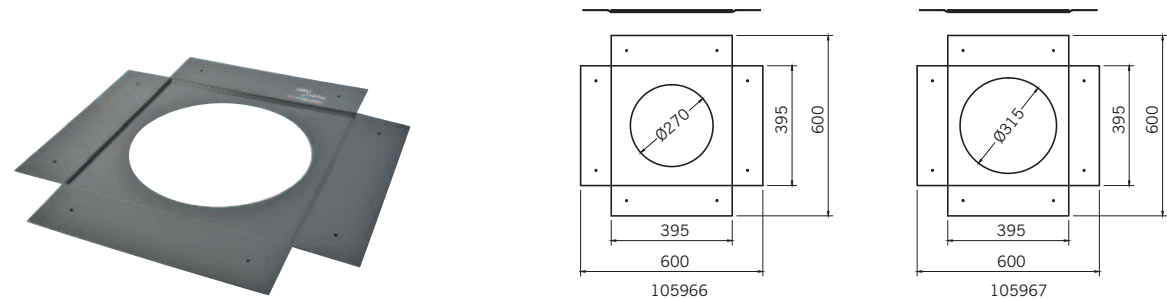


| Part No | Product Ref | Grating Size (mm) | Weight (kg) |
|---------|-------------|-------------------|-------------|
| 105965  | HPTG        | 230 x 230 x 16    | 1.30        |

Requires 50/75RR or 100/150RR as applicable

ACO Deck Supports for Circular Outlets

Deck supports are used where ACO Building Drainage HP Rainwater Outlets are installed in metal deck roof constructions, providing a stable and secure interface between the outlet and roof. Deck Supports are manufactured from mild steel and primed in a red oxide paint finish and finished in a polyester powder coat. They are suitable for all types of roof decking.



| Part No | Product Ref | Suitable for Outlet Product Ref  | Weight (kg) |
|---------|-------------|--|-------------|
| 105966  | 50/75DS     | 50HP-D; 75HP-D; 50HP-TD; 75HP-TD; 50/45HP-D; 75/45HP-D; 50/45HP-TD; 75/45HP-TD; 50/90HP-D; 75/90HP-D; 50/90HP-TD; 75/90HP-TD             | 2.20        |
| 105967  | 100/150DS   | 100HP-D; 150HP-D; 100HP-TD; 150HP-TD; 100/45HP-D; 150/45HP-D; 100/45HP-TD; 150/45HP-TD; 100/90HP-D; 150/90HP-D; 100/90HP-TD; 150/90HP-TD | 2.50        |



## ACO Car Park Gullies

**NEW!**



ACO Building Drainage cast iron Car Park Gullies are designed specifically for trafficked car park applications with direct vehicle access providing a robust, compact and durable drainage solution.

Car Park gullies are ideal for multi-storey car parks, shallow parking deck or podium deck applications and particularly suited for high traffic frequency.

### Key benefits

- Durable, robust cast iron construction
- Low profile design for shallow deck installations
- Quick installation
- Load Class M125 (12.5 tonne) grating to BS EN 1253
- Locked grating
- High flow rate – large area drainage
- Easy maintenance
- Fire proof – Class A1

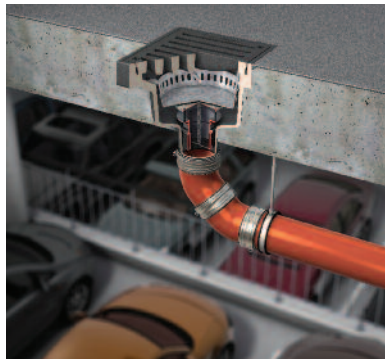
### Key features

- Stainless steel bolted grating for security
- 110mm spigot outlet for easy pipe connection
- Choice of horizontal or vertical outlet
- Removable galvanised steel dirt bucket
- Optional drainage weep hole facility
- Optional intumescent fire stop cartridge R120/2 hour rating (vertical outlet versions only)
- Black water-based paint finish

29



Shallow deck installation with 110mm horizontal outlet with weep-hole drainage facility. Complete with locked grating and galvanised steel dirt bucket.

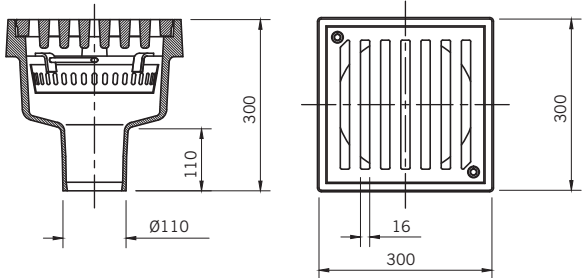


Through deck installation with 110mm vertical outlet complete with locked grating, galvanised steel dirt bucket and R120/2 hour fire stop cartridge fitted.



ACO Car Park Gully - Vertical Outlet, Framed

NEW!



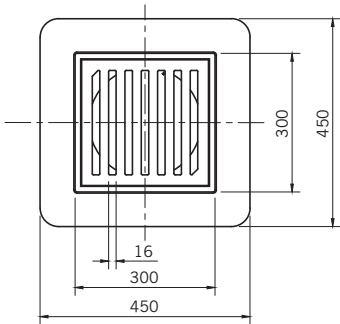
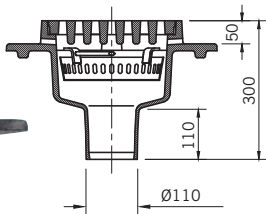
All dimensions in mm

| Part No | Spigot Dia (mm) | Flow Rate† (l/s) | Area Drained‡ (m²) | Flanged & Weep Holes | Load Class | Grating Locks | Galvanised Dirt Bucket | Weight (kg) |
|---------|-----------------|------------------|--------------------|----------------------|------------|---------------|------------------------|-------------|
| 105980  | 110             | 4.5              | 216                | No                   | M125       | Yes           | Yes                    | 35.00       |

† 35mm head of water  
‡ Rainfall intensity 75mm/hr (0.02083 l/s/m²)

ACO Car Park Gully - Vertical Outlet, Flanged Weep Hole

NEW!



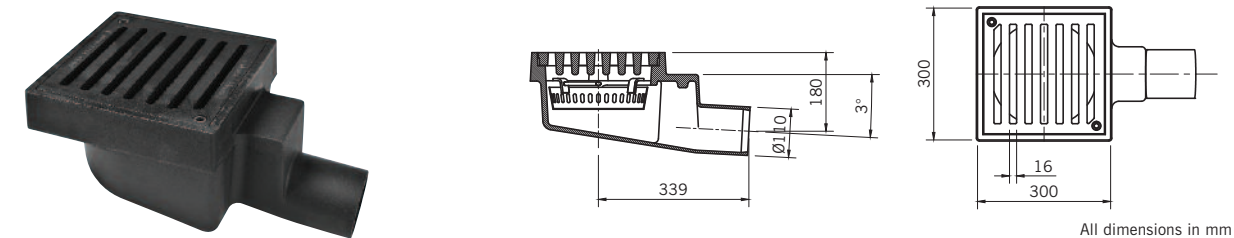
All dimensions in mm

| Part No | Spigot Dia (mm) | Flow Rate† (l/s) | Area Drained‡ (m²) | Flanged & Weep Holes | Load Class | Grating Locks | Galvanised Dirt Bucket | Weight (kg) |
|---------|-----------------|------------------|--------------------|----------------------|------------|---------------|------------------------|-------------|
| 105982  | 110             | 4.5              | 216                | Yes                  | M125       | Yes           | Yes                    | 47.00       |

† 35mm head of water  
‡ Rainfall intensity 75mm/hr (0.02083 l/s/m²)

ACO Car Park Gully - Horizontal Outlet, Framed

NEW!

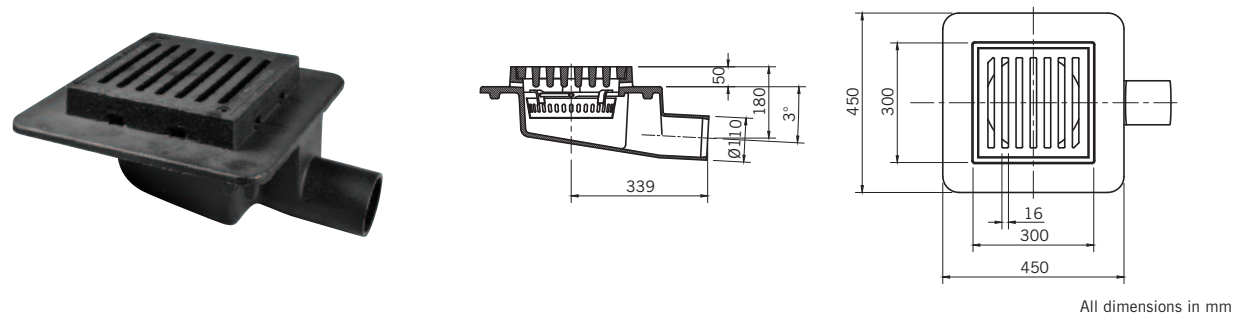


| Part No | Spigot Dia (mm) | Flow Rate† (l/s) | Area Drained‡ (m²) | Flanged & Weep Holes | Load Class | Grating Locks | Galvanised Dirt Bucket | Weight (kg) |
|---------|-----------------|------------------|--------------------|----------------------|------------|---------------|------------------------|-------------|
| 105981  | 110             | 4.5              | 216                | No                   | M125       | Yes           | Yes                    | 40.00       |

† 35mm head of water  
‡ Rainfall intensity 75mm/hr (0.02083 l/s/m²)

ACO Car Park Gully - Horizontal Outlet, Flanged Weep Hole

NEW!



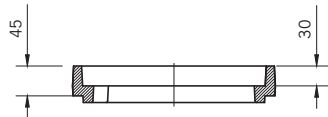
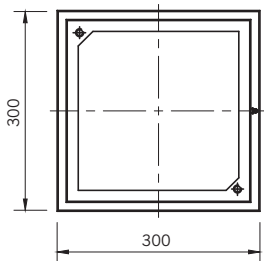
| Part No | Spigot Dia (mm) | Flow Rate† (l/s) | Area Drained‡ (m²) | Flanged & Weep Holes | Load Class | Grating Locks | Galvanised Dirt Bucket | Weight (kg) |
|---------|-----------------|------------------|--------------------|----------------------|------------|---------------|------------------------|-------------|
| 105983  | 110             | 4.5              | 216                | Yes                  | M125       | Yes           | Yes                    | 52.00       |

† 35mm head of water  
‡ Rainfall intensity 75mm/hr (0.02083 l/s/m²)

Accessories

NEW!

Raising Ring 45mm



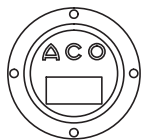
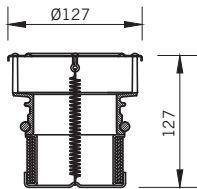
All dimensions in mm

| Part No | Clearance Holes for Grating Locks | Weight (kg) |
|---------|-----------------------------------|-------------|
| 105984  | Yes                               | 7.90        |

Raising rings are suitable for all ACO Building Drainage Car Park Gullies and may be cascaded in increments of 45mm. Extension bolts for grating locks not provided. M12 x 35mm stainless steel cap head screws supplied as standard.

Intumescent Fire Stop

NEW!



All dimensions in mm

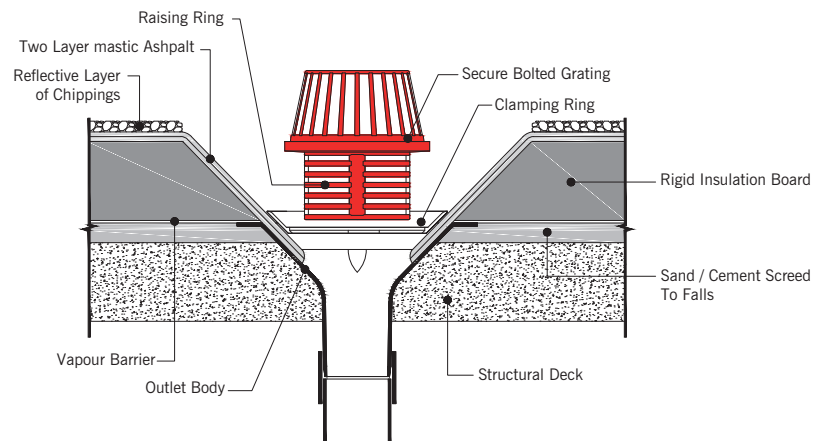
| Part No | Fire Rating | Weight (kg) |
|---------|-------------|-------------|
| 105985  | R30-120     | 0.30        |

Intumescent fire stop can only be used with vertical outlet Car Park Gullies. Please note that the Car Park gully flow rate is restricted to 3 l/s when a fire stop is fitted (144m<sup>2</sup> area drained at a rainfall intensity of 75mm/hr (0.02083 l/s/m<sup>2</sup>).

## Typical Flat Roof Construction Details

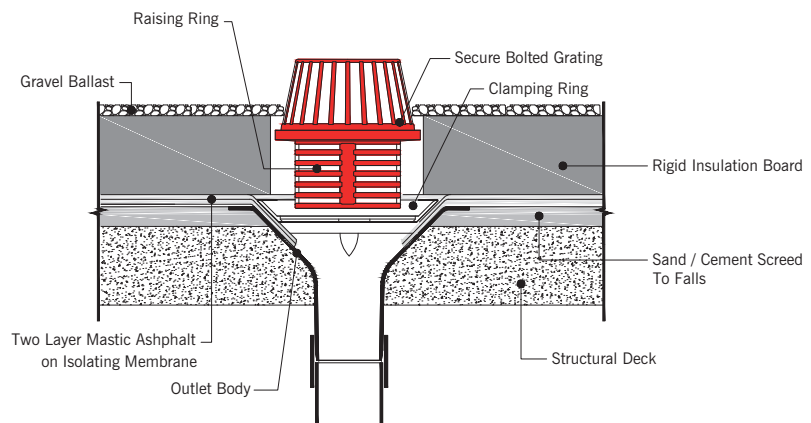
### Warm Roof

A warm roof is where the main mass of the roof structure lies below the main thermal insulation. The waterproof membrane is positioned above the insulation.



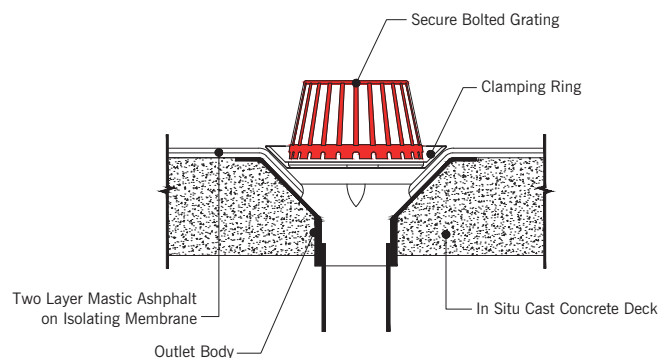
### Inverted Roof

An inverted roof is a form of warm roof where the main mass of the roof structure lies below the main thermal insulation, however, the waterproof membrane lies beneath the thermal insulation.



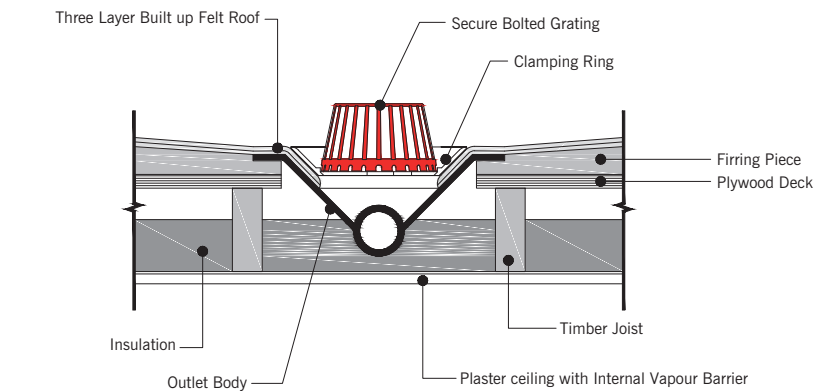
### Un-insulated Roof

A roof without thermal insulation. This type of construction is only permitted in non-habitable buildings, e.g. garages.

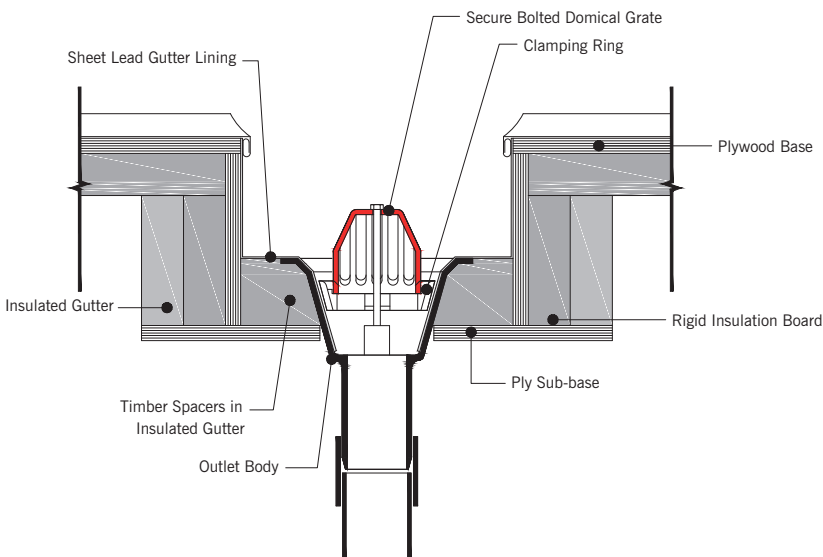


Typical Installation Guide & Construction Detail

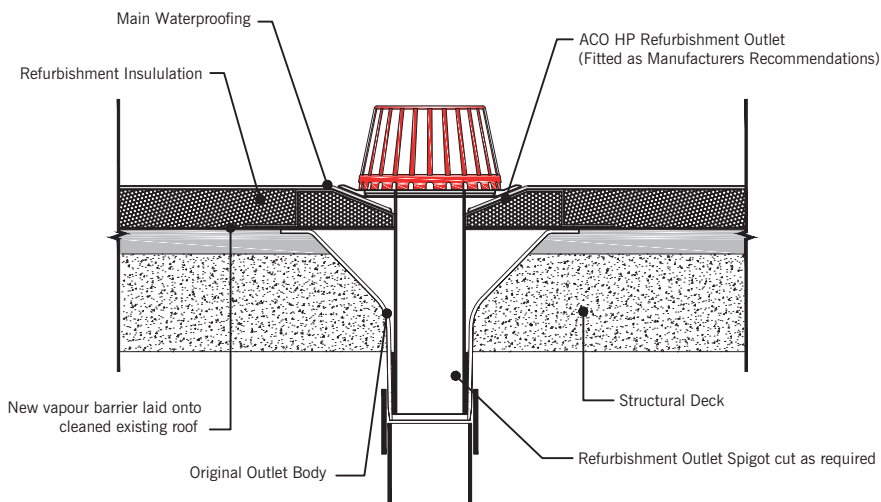
HP 90° outlet



Gully outlet

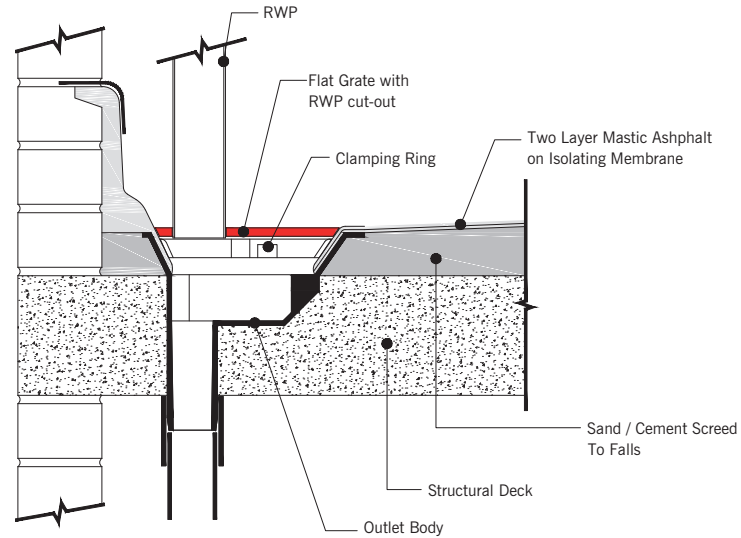


Refurbishment outlet

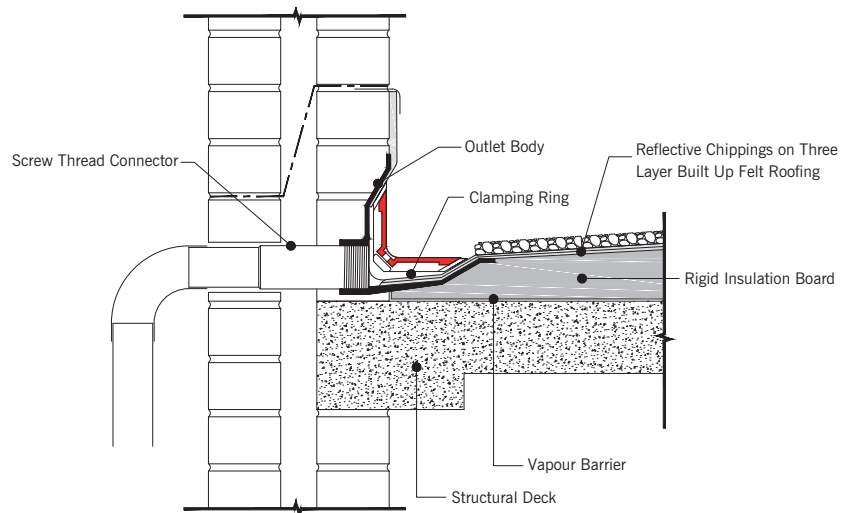


## Typical Installation Guide & Construction Detail

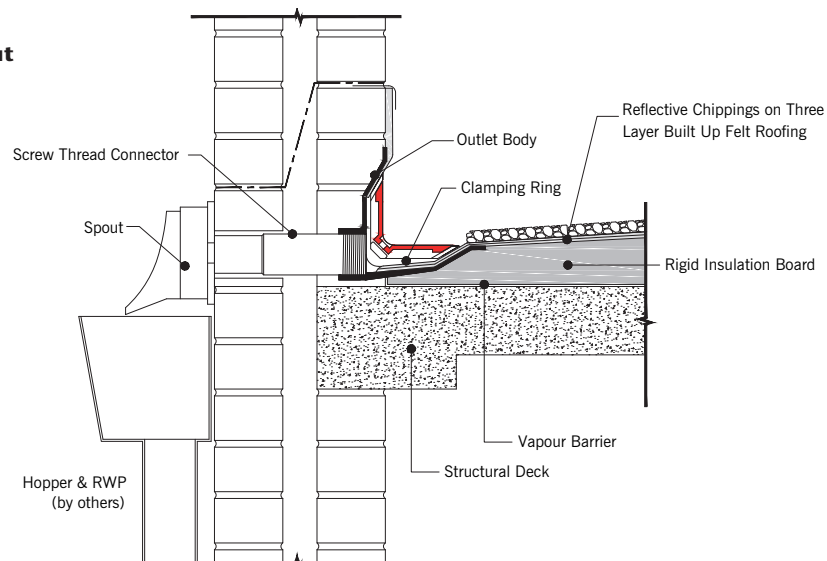
### Balcony outlet with downpipe



### Two-way outlet

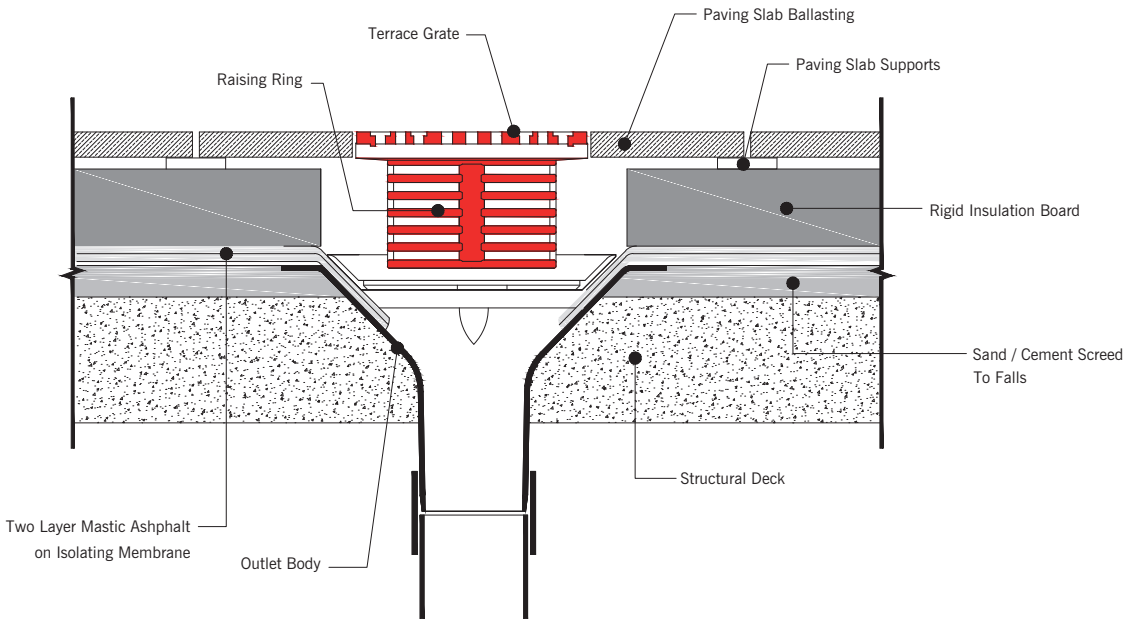


### Two-way outlet with spout

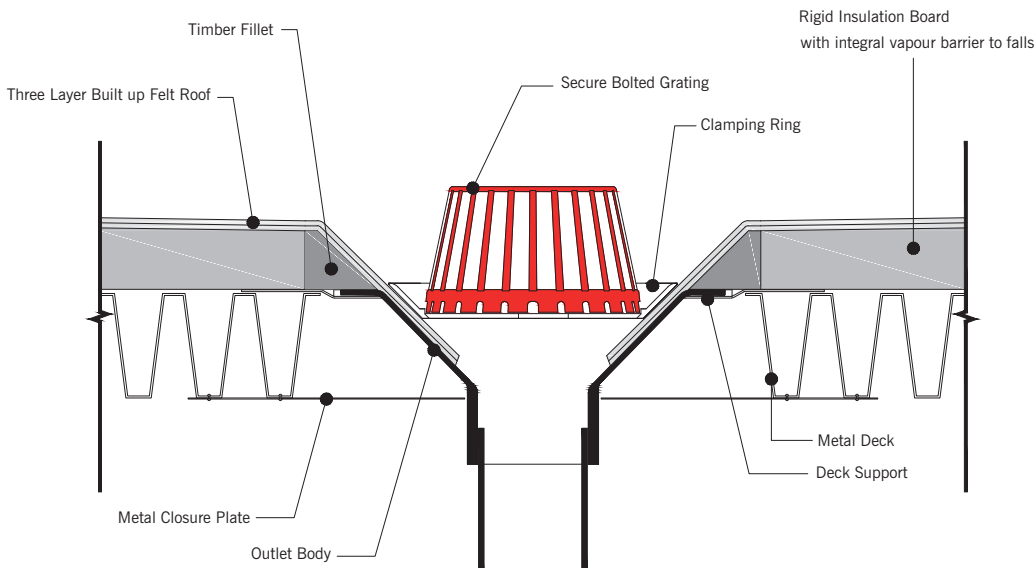


Typical Installation Guide & Construction Detail

Terrace grate



Metal deck support

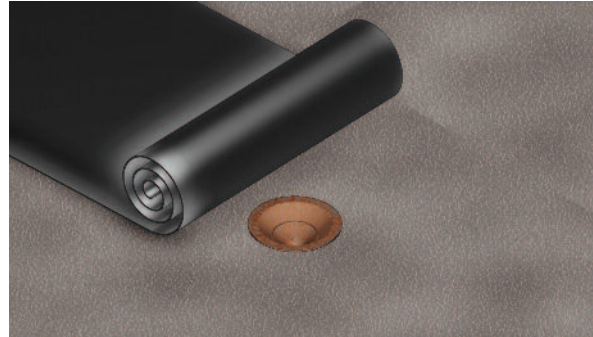


## Refurbishment Outlet installation Guide



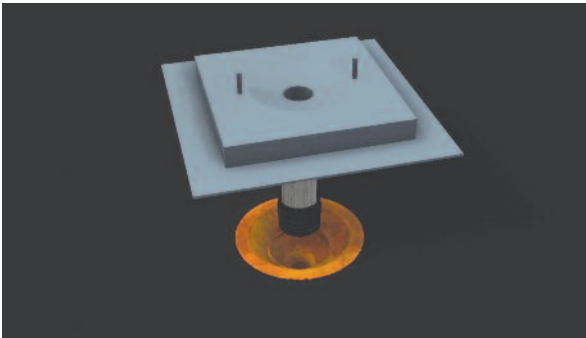
### Step 1

Remove redundant roofing materials; brush & clean surfaces ready for new installation.



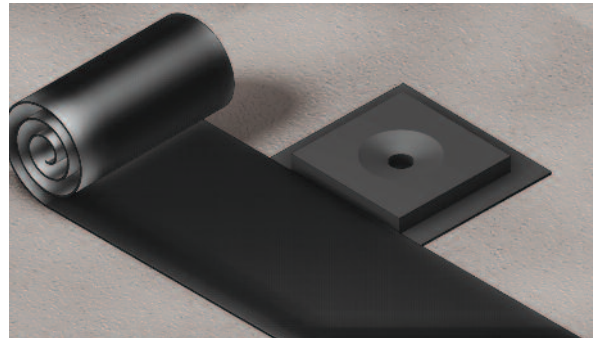
### Step 2

Lay new vapour barrier & bond into existing rainwater outlet.



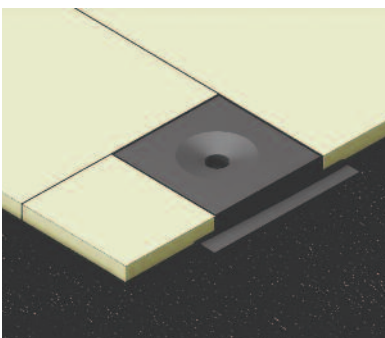
### Step 3

With the finned rubber seal **removed**, insert the ACO Refurbishment Outlet into the sump of the existing rainwater outlet body. If necessary, reduce the spigot length of the new outlet to allow full insertion. Replace rubber seal and re-insert.



### Step 4

Bond strips of vapour barrier to the Refurbishment Outlet flanges and existing vapour barrier to ensure a total seal.



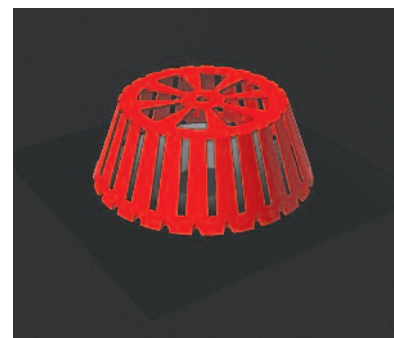
### Step 5

Cut and lay insulation board around refurbishment outlet. If insulation is greater than 50mm thick, chamfer board so that outlet is at same level as the outlet top surface.



### Step 6

Lay main waterproofing material over entire area and trim into the sump of the refurbishment outlet, ensuring the spigot outlet is clear of waterproofing material.



### Step 7

With the waterproofing material still pliable, install clamping ring and tighten nuts evenly. Fit the grating to complete the installation.



## Associated ACO Building Drainage Product Ranges

### ACO Engineered Solutions

ACO Engineered Solutions offer the designer / specifier a range of products virtually free from the constraints of 'off the shelf' items. Our engineers are able to offer detailed advice on all aspects of required design solutions, together with hydraulic flow analysis, practical site installation, suitable materials and best practices. ACO Engineered Solutions enjoy rigorous product management from initial enquiry through to post-delivery.

Examples of ACO Engineered Solution applications include:

- Workable drainage where there is limited invert depths
- Refurbishment situations with replacement channels and point drainage
- Interface with threshold details
- Discreet channel applications
- Radius channel applications

### ACO FreeDeck

ACO FreeDeck is an advanced roof and balcony drainage system combining line drainage with point drainage by using an open sided drainage channel system to collect and convey rainwater to drainage points within a raised or suspended deck structure. Manufactured in galvanised steel or stainless steel, ACO FreeDeck channel is simply laid directly onto the insulation layer or waterproofing membrane.



### ACO DeckLine 125

ACO DeckLine 125 is a shallow invert hot-dipped galvanised steel linear drainage system for applications up to and including Load Class C 250. It is ideally suited for parking decks and areas such as structural slabs or where excavation depth is limited. Available off the shelf ACO DeckLine is durable, 100% watertight and easy to install. ACO DeckLine 125 is tested and certified to BS EN 1433.



## Associated ACO Building Drainage Product Ranges

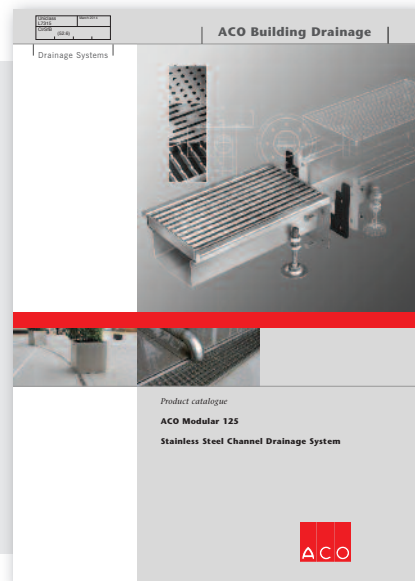
### ACO PIPE®

ACO PIPE® is manufactured from thin-wall austenitic stainless steel in grades 304 and 316 and is pickle passivated for optimum durability and corrosion resistance. ACO PIPE® is available in a wide range of socketed waste pipework products and accessories for above and below ground rainwater and industrial wastewater drainage applications. Used together with other ACO products it creates a perfect system and one stop sustainable drainage solution with unique advantages to the customer – lightweight, easy installation, low thermal expansion co-efficient, sustainable material, hygienic, near zero maintenance. When used with ACO stainless steel gullies and channel systems it provides a unique system for building drainage.



### ACO Modular 125

ACO Modular 125 Stainless Steel linear drainage is our most requested product range as it is suitable for most applications. ACO Modular 125 is manufactured in stainless steel grade 304 as standard and 316 to order. Available in a wide range of lengths, constant depths, sloping invert and gratings 'off the shelf', it can be modified to meet your exact application requirements. Used together with ACO Gully 157 or 218 and ACO PIPE® it offers the specifier, contractor and user the benefits of a unified system for building drainage and one stop drainage solution with unique advantages – fully tested and classified to BS EN 1433, CE marked, pickle passivated for optimum durability and corrosion resistance, vee-bottomed profiled channel for enhanced flow efficiency, optional grating security locks and lightweight channel sections for safe and easy installation.



## ACO Technologies plc

- ACO Building Drainage
- ACO Water Management  
Civils + Infrastructure  
Urban + Landscape
- ACO Sport
- ACO Wildlife

### ACO Building Drainage

A division of ACO Technologies plc  
ACO Business Centre  
Caxton Road  
Bedford  
Bedfordshire  
MK41 0LF  
Tel: 01462 810400  
Fax: 01462 851490

e-mail: [abdinfo@aco.co.uk](mailto:abdinfo@aco.co.uk)  
[www.acobd.co.uk](http://www.acobd.co.uk)

**The ACO Group: A strong family you can depend on.**

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