Roof drainage design

Gutter selection

Although aesthetic appearance is an important aspect in the selection of a particular gutter system, the following factors also need to be taken into consideration as they could influence the final choice of system.

1. The size of gutter and its flow capacity.
2. Whether the gutter is fitted level or to a fall.
3. If end or centre outlet position for downpipes are adopted.
4. The length of gutter to an outlet/downpipe.

Flow capacity

The maximum flow capacity of different Marley gutter systems can be compared from the tables shown opposite. It can be observed that the capacity of each system varies depending on profile, size and whether the gutter is fitted level or to a fall. For design purposes eaves gutters are normally sized to ensure the calculated run-off does not exceed 90% of the gutter capacity. It is also recommended that gutters are fixed level as this enables the gutter to be fitted as high as possible to ensure the correct relationship is maintained at the roof edge.

In order to combine appearance with optimum performance, careful consideration needs to be given to the position of outlets bearing in mind the flow characteristics of each system. It can be seen that a centre outlet is more efficient than an end outlet as the area that can be drained is almost double. As a result it may be possible to reduce or eliminate the number of rainwater pipes required and thereby introduce economies through good design.

Rainwater pipe sizes

With the exception of the Industrial and Miniline gutter systems which have 110mm and 53mm diameter downpipes respectively, all other Marley PVCu gutter systems incorporate outlets suitable for 68mm circular or 65mm square rainwater pipes. This size of downpipe has been selected as it has the necessary capacity to accommodate the maximum flow from any of the gutter systems.

Effect of valleys

Where valleys occur it is good practice to position an outlet adjacent to the internal angle to deal with the concentrated discharge that is likely at such points during peak flow conditions. Depending on the size of roof it may also be beneficial to fit a corner hopper where the flow is considerable.

Long roofs

The spread of water as it leaves the roof edge varies considerably depending on the roof surface and pitch. On long roofs it may be necessary to select a wider gutter than capacity calculations would normally dictate. This is particularly important with sheet metal or similar profiled roofs where there is a tendency for the discharge to follow the roof angle and overshoot the gutter.

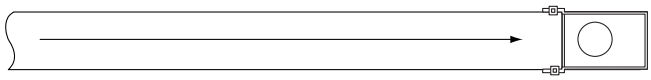
Gutter length

On long runs frictional resistance can reduce gutter capacity and efficiency. To allow for this, reduction factors can be applied or gutters sized to allow freeboard in accordance with BS EN 12056-3: 2000 recommendations.

Flat roof outlets and hopper heads

The flow characteristics of different size flat roof outlets and hopper heads are shown on page 38.

Outlet at one end



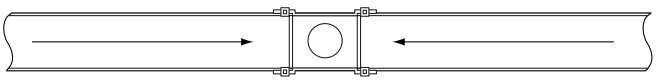
Gutter system	level		fall 1:600	
	m^2	l/s	m^2	l/s
Miniline	15	0.33	19	0.40
Clip-master	43	0.90	48	1.00
Premier	57	1.20	68	1.43
Flowline	70	1.46	84	1.75
Deepflow Plus	90	1.90	110	2.31
Classic	103	2.16	---	---
Industrial	127	2.67	152	3.20

Outlet at one end with an angle within 2m of outlet

Gutter system	level		fall 1:600	
	m^2	l/s	m^2	l/s
Miniline	13	0.27	17	0.35
Clip-master	39	0.81	43	0.90
Premier	51	1.06	61	1.27
Flowline	63	1.31	76	1.58
Deepflow Plus	81	1.70	99	2.07
Classic	93	1.94	---	---
Industrial	116	2.44	138	2.90

For gutters with angles further than 2m from the outlet increase the above figures by 5%.

Outlet in the centre



Gutter system	level		fall 1:600	
	m^2	l/s	m^2	l/s
Miniline	25	0.54	30	0.64
Clip-master	84	1.75	92	1.92
Premier	114	2.39	136	2.86
Flowline	135	2.84	170	3.40
Deepflow Plus	185	3.90	226	4.75
Classic	216	4.55	---	---
Industrial	270	5.68	326	6.84