

Specification for Roof Drainage Design.

Design Basis >>

Alutec gutter flow capacities shown in the flow capacity table are calculated with the gutters being fixed nominally level. Most metal gutters are installed level for aesthetic purposes. However, if installed to a fall of 1:600 the flow capacity will be marginally improved.

Factors to be considered when designing an eaves drainage system >>

1. Rainfall Intensity design rate (l/s/m²).
2. Effective Roof Area (ERA) to be drained (m²).
3. Gutter flow capacity (l/s).
4. Size, number and position of outlets.
5. Frictional resistances in long gutter runs and the number of corners.

Rainfall Intensity (design rate) >>

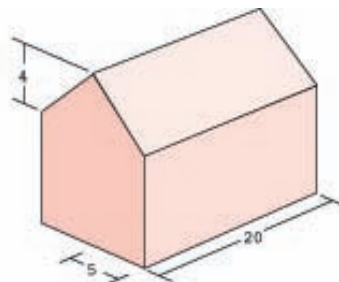
Building Regulations 2000 Document H3 recommend a general design rate of 0.021 l/s/m² (which is virtually the same as the traditional design rate of 75mm/hour) for eaves gutters where if overflowing occurs, water overspill will discharge clear of the building without risk of water ingress. If required, alternative rainfall intensity design rates can also be considered. Meteorological data published in the National Annex to EN12056-3 and Building Regulations 2000 Document H3, show varying rainfall intensities through out the U.K. depending on geographical location.

The Flow Capacity Table indicates maximum flow, the gutter being full to the brim, however EN12056-3 states the design rate run-off from the roof should not exceed 90% of the gutter capacity. Also shown are the differences between outlet capacities when positioned centrally or at the end of a gutter run.

Effective Roof Area >>

Effective roof area can be determined by calculation as set out in EN12056-3.

The following example shows a basic calculation method that can be used as a guide in establishing the effective roof area (ERA).



$$ERA = \left(\frac{4}{2} + 5 \right) \times 20 = 140m^2$$

Specification for Roof Drainage Design continued/...

Gutter Capacity >>

Assuming the recommended rainfall intensity of 0.021 l/s/m² is acceptable, determine if the gutter outlet is to be positioned centrally, or end of the gutter run. Refer to the Flow Capacity Table and find the nearest roof area m² in either the 'central' or 'end outlet' options to determine the size/type of gutter/rainwater pipes required.

Should a different rainfall intensity design rate be required, multiply the alternative design rate by the ERA to establish the required gutter capacity (l/s). Then refer to the Gutter Flow Capacity Table and select the nearest gutter flow capacity (l/s). Ensure that appropriate proportional allowances for central or end of gutter outlets are made.

Example :-

Alternative design rate 0.025 l/s/m² x 140m² = 3.5 l/s

3.5 l/s into central outlet = Ogee No. 46 with 63mm outlet

Frictional Resistances >>

Gutter Angles: EN12056-3 recommends that the gutter capacity should be reduced by a factor of 0.85 if the gutter run includes one or more angles greater than 10 degrees and that positioning of outlets adjacent to angles should be avoided.

Long Gutters: Frictional resistance in very long gutter runs will effectively reduce the flow capacity hence reduction factors should be applied in accordance with recommendations detailed in EN12056-3.

Valley Discharges: Where a discharge from long valley occurs, it is prudent to consider a corner hopper or purpose made gutter angle with larger catchment area, to cope with the concentrated volume of rainwater during storm conditions.

Compatibility >>

To avoid bi-metallic corrosion, ensure electrolytically incompatible materials do not come in direct contact with un-insulated plain aluminium surfaces. In particular ensure that the recommended compatible screws and fixings are used. Polyester powder coated surfaces will give limited protection, but should not be solely relied upon. If in doubt, please ring the Technical hotline.

Durability >>

Low maintenance life expectancy is approximately 40 years, however in industrialised and marine environments, this may be reduced.

If regularly maintained, the decorative life of the polyester powder coating is approximately 35 years, under normal UK climatic conditions.

Specification for Roof Drainage Design continued/...

Chemical



All products are naturally corrosion resistant under normal atmospheric conditions. Not to be used for chemical drainage or in conjunction with foul waste drainage.

Fire



In general Alutec rainwater products do not aid combustion and are rated as follows:

Finish rating:

Plain finish - non combustibility
PPC - 0.1 fire propagation index
PPC class 1, flame surface spread

Test standard:

BS 476: Part 4
BS 476: Part 6
BS 476: Part 7

Thermal



Coefficient for thermal expansion - 0.000026 deg C for cast aluminium and 0.000023 deg C for sheet and extruded aluminium. Melting point approximately 660 deg C.