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Metal Gutters The Guide

METAL GUTTER
MANUFACTURERS
ASSOCIATION

FORWORD

The Metal Gutter Manufacturers Association (MGMA) was formed to represent the leading UK manufacturers of metal gutters. The Association seeks to foster and take part in research and all forms of technical development in relation to metal gutters and to encourage the best methods of their production and use within the construction and allied industries.

Membership of MGMA is open to all companies who manufacture and market metal gutters, downpipes and their associated fittings in the United Kingdom. The MGMA is the only organisation which represents the major UK manufacturers and is, therefore, a valuable source of information and advice on all matters relating to metal gutters.

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1 INTRODUCTION

The roof drainage system is an important aspect of the overall roof design. This is particularly the case for parapet and valley gutters which are over the building where any overflow into the building would be unacceptable. Eaves gutters are normally positioned outside the building where occasional overflow would not be harmful.

Eaves guttering is generally fixed to the fascia or rafters of the building. Most eaves gutters are laid level or nominally level (1:600). Any falls should be laid in the direction of the outlets which discharge rainwater via downpipes to surface or underground drainage points.

For detailed guidance refer to BS EN 12056:3 – 2000: *Gravity Drainage within Buildings*.

The design process and the correct selection of materials can be complex and it is recommended that the designer consults an MGMA member company. A list of members is available from the Association; alternatively please visit the MGMA website at www.mgma.co.uk.

2 GLOSSARY

Parapet
A wall extending above the roof or balcony level.

Eaves
Bottom edge of roof.

Valley
Sloping or horizontal channel at base of two sloping roofs.

Weir overflow
A spout or cut out to a gutter end plate to allow any overflowing to discharge outside the building.

Organic coating
A coating material consisting of substances deriving from a natural fossil resource.

Laminate
Two materials bonded together.

Joggle joint
Gutter joint where one gutter end is shaped (expanded) to receive the other.

Butt joint
A union fitting to joint two gutter ends together.

Low modulus
A sealant that does not set hard after curing to allow for thermal movement of jointed surfaces.

Lateral alignment
The straightness of a horizontal guttering fixing background.

Black steel
Raw unprotected steel.

Architectural PPC
Polyester powder coating. A powder paint applied electrostatically, then heat cured to fuse the paint to the material surface.

Eared socket
Pipe jointing socket with integral ‘fixing lugs’.

Ring shank nail
Nail with horizontal ridges (annular rings) the full length of the nail, difficult to extract once driven in.

Hammer screw and plug
Nail with a twisted shank resembling a coarse thread, with a plastic plug fitted to the end. Plug inserts into pre-drilled hole, nail hammered into plug.

Substrate
A solid length of uniform profiled material.

3 DESIGN CONSIDERATIONS

A roof drainage system comprises of gutters, outlets and downpipes. Each can be designed separately provided the outlet and pipe work are large enough for the flow to discharge freely from the gutter:

a) The gutter slope is assumed to be less than 1 in 350, that is nominally level.

b) The gutter has a uniform cross section.

c) The distance from a stop end to the outlet is less than 50 times the upstream water depth. Adjustment in design is recommended if the length of gutter is greater than 50 times upstream water depth.

d) The distance between outlets is less than 100 times the upstream water depth.

e) With large eaves and valley gutters it is important to provide sufficient adjustment within the supports to avoid any significant ponding.

f) Particular attention should be paid to the gauge and support centres if the gutter is likely to, or is required to, take foot traffic for maintenance or access.

g) It is recommended that weir overflows are incorporated within internal gutters.

3.1 Sizing

Check that the system will cope with the roof area to be drained. Refer to manufacturers' own charts and BS EN 12056:3.

The designer of a guttering system should consider the total roof area, the number of outlets and the building location and its function relating to the highest rainfall protection rate required.

3.2 Strength and durability

When specifying a guttering system it is important to remember that all gutters are subject to relatively severe corrosive conditions and the specifier must be careful to choose the correct materials, seals and coatings.

The following factors need to be taken into account:

i) Design life of the building.

ii) Accessibility of gutter and pipe for example single storey (easy to replace) or multi-storey installation – should equal the design life of the building.

iii) Geographical location and known weather patterns.

iv) Weather and environmental hazards (for example, heavy/industrial, coastal location).

v) Public use/traffic hazards.

Further information can be obtained from BS EN 12056:3.

3.3 Standards and testing

Products manufactured or formed on site by MGMA members conform to the relevant BS or CEN standards. Careful consideration should be given to the insulation requirements of all gutters that fall within the current Building Regulations and Codes of Practice.

3.4 Design checklist

The following checklist has been prepared to assist the specifier in avoiding common pitfalls and to serve as a useful reminder of all areas that must be considered when specifying a roof drainage system.

3.4.1. Do:

i) Instruct installer to work to manufacturers' instructions supplied.

ii) Specify corrosion-resistant and compatible fixings of the correct size.

iii) Position the gutter to the correct height relative to the roof edge.

iv) Allow for thermal movement.

v) Specify in contract any water testing requirements.

vi) Check that the finish is even and adequate over the substrate.

vii) Protect the sealant from excesses of heat and cold whilst in storage.

viii) Check that the product and its coating are compatible with the environment and dissimilar mating or adjacent components for example, copper roof and aluminium are NOT compatible.

ix) Check compatibility of the jointing details of outlets and pipes.

x) If in doubt always consult the manufacturer.

3.4.2 Do not:

i) Use unsuitable sealant.

ii) Use fixings which will corrode.

iii) Force fit materials – consult the manufacturer.

iv) Store in unsuitable site locations or at unsuitable temperatures.

v) Work without manufacturers' instructions; if not supplied ASK.

3.5 Roof drainage calculations

3.5.1 Flow capacities

The flow capacities for external gutter systems are based on a rainfall rate (I) determined from a geographically variable one year event, and are stated in litres per second per square metre (l/s)/m^2. This design rate is only suitable for eaves gutters where overflow is not likely to occur inside the building.

Higher rainfall rates will need to be used when designing internal gutters (that is, valley/parapet wall). See BS EN 12056:3 national annex NB for further information.

Each rainwater system is unique and must be designed as such. Flow rates are affected by system length, angles, gutter and outlet sizes, roof pitch etc.

Refer to BS EN 12056:3 table for reduction factors.

3.5.2 Calculation of effective roof area

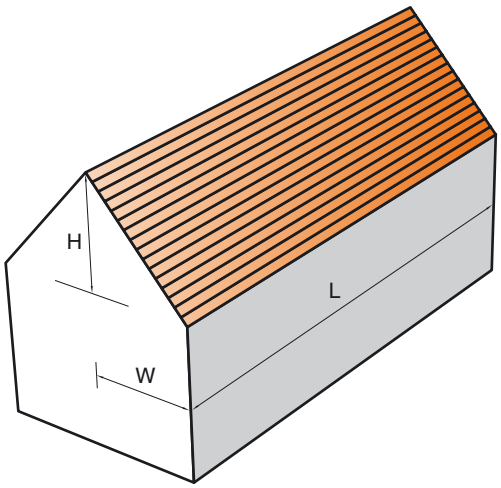
H = height of roof pitch in metres

W = width of roof pitch in metres

L = length of roof in metres

Effective Roof Area (Ae) = L × (w + 0.5H)

Run off Q = Ae I



Effective Catchment Area (sq.m) = L × (W + H/2)

4 THERMAL REQUIREMENTS

4.1 The Regulations

The introduction of Approved Document L2 to the Building Regulations (2002 edition) *Conservation of Fuel and Power* has made it necessary for the building designer to pay more attention to the thermal performance of individual details of the construction which were not previously defined.

Approved Document L2 requires that the U values of both metal site-assembled constructions and composite constructions must be less than or equal to 0.35W/m^{2}K and 0.25W/m^{2}K respectively. (The corresponding values in Scottish Technical Standard J are 0.30W/m^{2}K and 0.25W/m^{2}K). These values include associated components such as gutters.

The thermal performance of a building is important because it affects the amount of energy required to heat the building and will influence the running costs and the comfort to the occupants. Approved Document L2 defines the required levels of performance in terms of U values, thermal bridging and air tightness, and explains how the requirements can be realised. Site testing of the completed building is required in many cases to ensure that the design performance has been achieved

4.2 Thermal bridges

The standard measure for calculating the heat loss through the building fabric is the U value. This applies to plane areas of the walls or roofs and does not take account of any extra heat loss at the junctions between elements or around other openings such as gutters. In these areas, known as thermal bridges, the geometry of the structure and/or the presence of high conductivity materials crossing the insulation leads to heat flows that are locally higher than in surrounding areas. These both add to the total energy demand of the building and lower the internal surface temperatures. Depending on the environmental conditions within the building and the nature of the internal surfaces this can lead to surface condensation or, less commonly in industrial buildings, mould growth.

Approved Document L2 requires that the building fabric should be constructed so that there are no significant thermal bridges or gaps in the insulation layer(s) within the various elements of the fabric, at the joints between elements and at the edges of elements such as those around gutters. Thermal bridging within elements, such as at spacers, is taken into account when calculating U-values, so here it is necessary to concentrate on the thermal bridging at junctions and penetrations. One way of demonstrating compliance is to utilise details and practice that have been independently demonstrated as being satisfactory.

This can be done for domestic style constructions by following the details given in the robust construction details publication. However, as these often do not apply to industrial buildings, calculations or the use of robust design practices must be used to demonstrate compliance.

The publications, BRE IP 17/01 *Assessing the effect of thermal bridging at junctions and around openings* and the MCRMA technical paper No 14 *Guidance for the design of metal roofing and cladding to comply with Approved Document L2:2001*, specify the necessary procedures.

At the time of publication, the government is changing the Part L2 Regulation to meet the requirements of the European energy directive which comes into force on 1st January 2006.

For up to date information please check the Building Regulations section of the government web site at www.odpm.gov.uk.

5 MATERIALS

Gutters are subjected to corrosive conditions including standing water and debris. The selection of materials and regular maintenance are important considerations. Metal gutters can be made from ferrous or non-ferrous materials. Metal eaves gutters are available with decorative organic coatings so that the gutter can also act as a decorative feature. It is recommended that all galvanised steel gutters should be painted inside after installation with a bitumen paint or equivalent to ensure satisfactory durability.

The materials used to manufacture metal guttering fall into two main categories:

5.1 Ferrous

Cast iron
Mild steel

5.2 Non-ferrous

Aluminium
Copper
Zinc
Stainless steel

For detailed information on specific materials the following organisations should be contacted:

Aluminium Federation Limited
Broadway House
Calthorpe Road
Five Ways
Birmingham Tel: 0121 456 1103
West Midlands Fax: 0121 456 2274
B15 1TN Web: www.alfed.org.uk

Cast Iron Drainage Association
Wyatt House
72 Francis Road
Edgbaston
Birmingham Tel 0121 454 8181
West Midlands Fax: 0121 455 9785
B16 8SP Web: www.cidda.com

Copper Development Association
Grovelands Business Centre
Boundary Way
Hemel Hempstead Tel: 01442 275700
Hertfordshire Fax: 01442 275716
HP2 7TE Web: cda.org.uk

Stainless Steel Advisory Centre
British Stainless Steel Association
Broomsgrove
59 Clarkehouse Rd Tel: 0114 267 1260
Sheffield Fax: 0114 266 1252
S10 2LE Web: www.bssa.org.uk

Steel Construction Institute
Silwood Park
Ascot Tel: 01344 623345
Berkshire Fax: 01344 622944
SL5 7QN Web: www.steel-sci-org

Zinc Pigment Development Association
42 Weymouth Street
London Tel: 020 7499 6636
W1N 3LQ Fax: 020 7493 1555

5.3 Material and finishes specifications

a) Galvanised After Manufacture (GAM) is available in a range of material thicknesses from 3.0mm to 6.00mm. The black mild steel substrate should comply with BS1448 and BS EN 10130 (where applicable) and be galvanised to BS 729 (1986).

b) Galvanised Before Manufacture (GBM) is available in a range of material thicknesses from 1.6mm to 3.00mm and should comply with BS EN 10142 (1991). With a minimum Fe E220g steel specification and a 600gms/m^2 coating weight.

c) Aluminium is available in a range of material thicknesses from 1.5mm to 3.00mm and should comply with BS EN 485/1/2/4515,573 for heavy duty gutters. In accordance with EN612, light duty roll-formed gutters can be made from lighter gauge material.

5.3.1 Recommended finishes as per BS EN 12056:3

Factory applied coatings	Aluminium	Mild steel	Pre-galv steel	Stainless steel	Cast iron	Zinc	Copper	Decorative	Protective
Architectural powder coating	✔		✔	✔				✔	✔
Anodising	✔							✔	✔
Galvanising		✔							✔
Liquid coating	✔		✔					✔	✔
Primer		✔			✔				✔
Laminate	✔		✔					✔	✔
Site applied coatings									
Wet paint	✔	✔	✔	✔	✔	✔	✔	✔	✔

5.3.2 Surface texture

Raw substrate	**Smooth**	**Medium**	**Coarse**
Extruded aluminium	✔		
Die-cast aluminium		✔	
Sand-cast aluminium			✔
Cast iron		✔	✔
Post-galv steel		✔	
Pre-galv steel	✔	✔	
Mild steel	✔		
Stainless steel	✔		
Copper	✔		
Zinc	✔		

5.3.3 Gloss levels

Smooth painted or coated surface conditions are defined as:

Matt	30-35% gloss
Satin	60-65% gloss
Gloss	85-90% gloss

5.4 Insulated gutters

It is current practice that all gutters within the building envelope require to be insulated. This can be achieved using one of the following methods:

a) Foam injected. Consisting of a gutter manufactured from two metal skins with a CFC-free foam core.

b) Factory assembled. Consisting of a gutter manufactured from either aluminium or galvanised steel as per the above specification with a core consisting of a closed cell insulation board.

c) Site assembled. Consisting of a gutter manufactured from either aluminium or galvanised steel with an insulation infill consisting of either a quilt or rigid board. A pre-shaped closure flashing to suit.

5.5 Compatibility

It is recommended that complementary items such as stop ends, outlets, angles, sumps etc should be made from the same base material as the gutter system.

5.6 Material protection

Gutters galvanised after manufacture (GAM) provide a higher level of protection due to the process being carried out after all forming, welding and fabrication.

Gutters galvanised before manufacture (GBM) should be manufactured using G600 material which offers the highest level of protection available for this substrate. Fabrication and welding processes will however, destroy this coating therefore post-manufacturing treatment is required locally to restore corrosion resistance using a zinc-rich 'cold galvanising' paint.

Mill-finish aluminium, whilst adequate for the majority of applications, can be post-treated with polyester powder coating for further protection when required.

Pre-coated, galvanised steel light gauge gutters, by nature of the Plastisol finish coating, afford a level of protection from corrosion.

Post-installation protective coatings can be required depending on gutter location and use, weathering periods, access etc.

Note on finishes

i) For aesthetic purposes both aluminium and GBM steel gutters can be polyester powder coated. However, this coating should not be relied upon as the only form of protection.

ii) Full gloss finish will highlight any surface imperfections on undulations and is not recommended.

6 GUTTER MANUFACTURING PROCESS

6.1 Gutters

Principal manufacturing processes

Process	Aluminium	Cast iron	Steel	Copper	Zinc	Stainless steel
Extruding	✔					
Sand casting	✔	✔				
Die pressing	✔	✔				
Die casting	✔					
Press forming	✔		✔	✔	✔	✔
Roll forming	✔		✔	✔	✔	✔

6.2 Rainwater pipes

Principal manufacturing processes

Process	Aluminium	Cast iron	Steel	Copper	Zinc
Extruding	✔				
Centrifugally spun		✔			
Sand casting	✔	✔			
Press forming	✔		✔	✔	✔
Roll forming and seam welding	✔		✔	✔	✔

Casting:

The pouring of molten metal into a sand or metal mould in order to produce a traditional shaped gutter or downpipe.

Die casting:

A process whereby molten metal is poured into a two part mould referred to as a ‘die’. Once the molten metal cools, the die is separated to remove the finished casting.

Extruding:

Heat softened aluminium billet being forced under extreme pressure through a profiled steel die, achieving continuous lengths of gutter or pipe profile with smooth surfaces.

Centrifugally spun:

Pouring molten iron into a hollow rotating sand mould. When the spinning molten iron has solidified to a certain thickness, then pouring stops.

Roll-forming:

Involves feeding flat strips of metal into a machine containing rollers or progressively changing form which gradually change the flat strip into a finished gutter or pipe profile.

Roll-forming and seam welding:

This is a continuous process where once the roll-forming is complete, the closed edges of the formed pipe are electronically resistance-welded together.

Press forming:

Flat sheet metal machine pressed (folded) in a sequence of bends.

7 TYPICAL SHAPES AND PROFILES

7.1 Gutters

Plain half round

Beaded half round

Deep half round

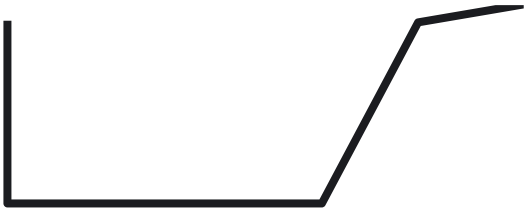
Front beaded half round

Ogee

Moulded

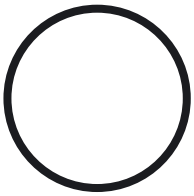
Box

Valley

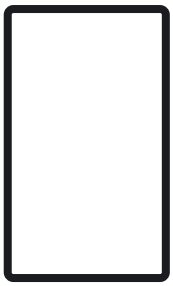


Parapet

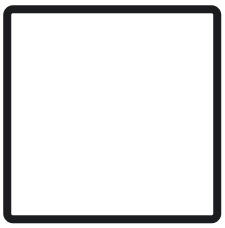
7.2 Downpipes



Round



Rectangular



Square

Bespoke customer designs – refer to MGMA members for guidance.

See sections 8 and 9 for methods of fixing and jointings.

8.1 Gutter fixings and fasteners

Screws
Nuts and bolt
Ring shank nails
Spike and ferrule
Helical fixing
Self drill screw
Rivets

8.2 Pipe fixings and fasteners

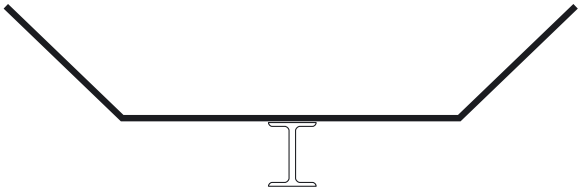
Screws
Masonry plug and screw
Rawl bolt
Hammer screw and plug
Pipe nail
Pipe bobbins for packing
Rivets

8.3 Compatible fixings

Materials for gutters, downpipes, accessories	Aluminium	Austenitic stainless steel	B.Z.P. steel	Brass
Aluminium	✔	✔		
Cast iron		✔	✔	
Copper				✔
Steel			✔	
Zinc			✔	

8.4 Typical supports and brackets for gutters and downpipes

8.4.1 Valley and eaves gutter supports



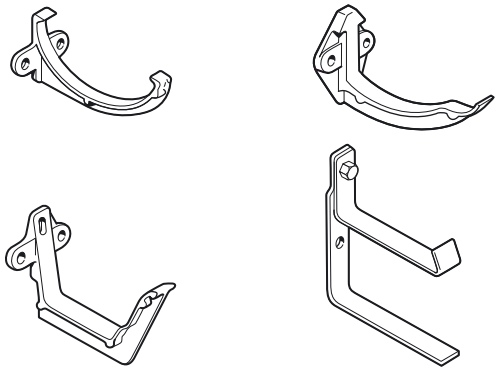
Gutters may be supported along their whole length via continuous beams.

Valley gutters may be supported along their whole length by extending gutter sides to wrap over first purlins either side of the valley.

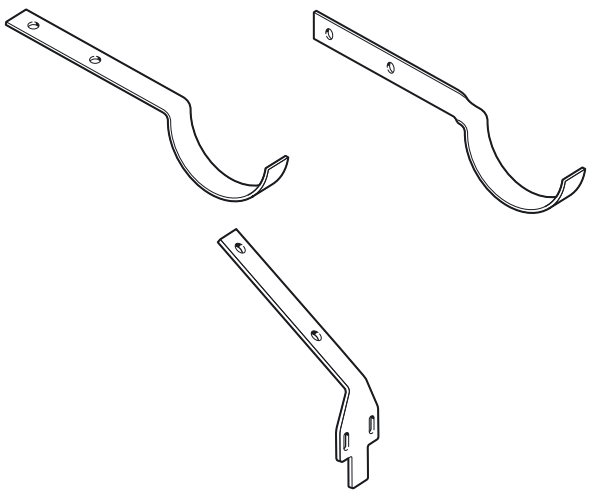
Support bracket centres. These are generally between 600mm-1000mm maximum depending on size and loading. Refer to EN 1462 : *Brackets for eaves gutters, requirements and testing* for more detailed information.

8.4.2 Eaves gutter supports

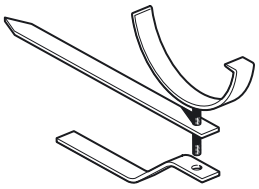
Fascia mounted brackets



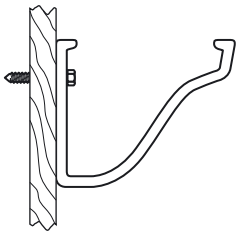
Rafter mounted brackets

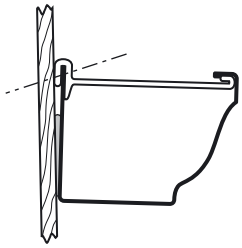


Masonry fixings

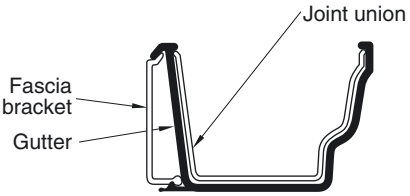


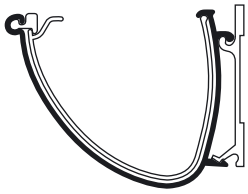
Direct fixings





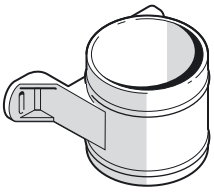
Secret fixings



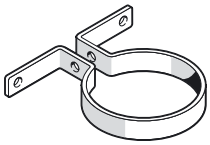


8.4.3 Downpipes

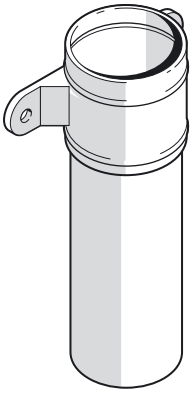
Sockets and brackets



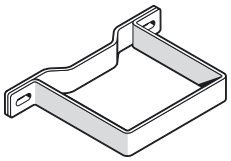
Eared or non eared socket



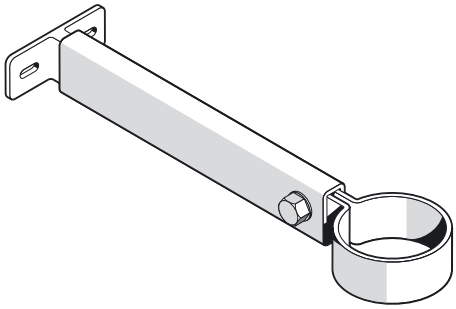
One part pipe clamp



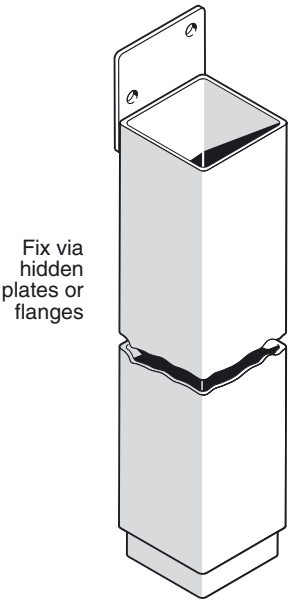
Two part pipe clamp



Two part rectangular clamp



Pipe clamp with extension arms



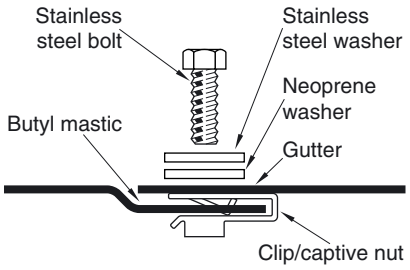
Secret fixing

9.1 Design

A variety of joints are used for the different gutter designs and materials including joggles, overlaps and butt straps. In each case, a sealing material is used to seal the joint. For a trouble-free gutter it is essential that the joints are assembled carefully according to the manufacturer's instructions using the recommended sealing method. For joints in galvanised gutters use cross-linked butyl mastic as a sealing material.

Gutters are subject to thermal expansion and contraction and must be allowed to move or be controlled depending on design. In most cases, all gutter systems allow for thermal movement however, for rigid jointed gutters flexible joints are available if required.

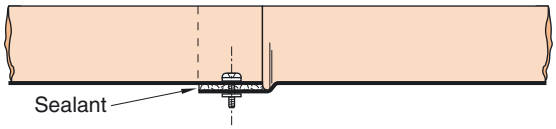
9.2 Typical industrial bolted gutter joints



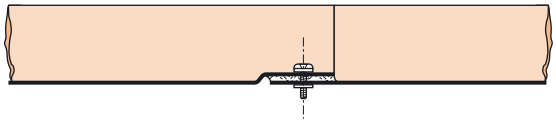
9.3 Gutter joints

Mechanically fixed spigot and socket or joggled gutter joints

External bolted socket

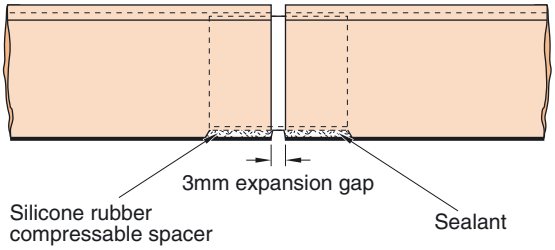


Internal bolted spigot



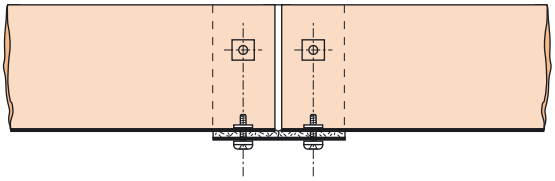
Unbolted internal and external 'snap fit' connectors

Typical boltless 'snap fit' gutter joint

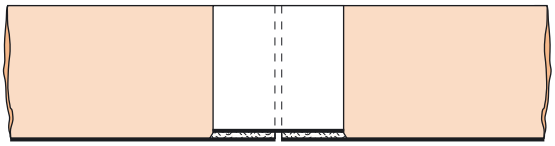


Butt joint with internal/external coupling mechanically fixed together

External connector (bolted)

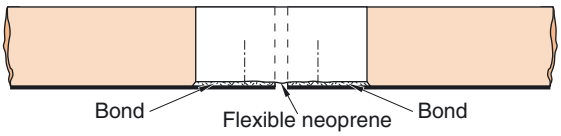


Internal connector (bolted, bonded or secret fix)

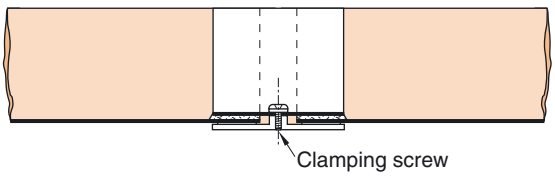


Proprietary expansion joints are required by design

Flexible expansion joints



Proprietary expansion joints

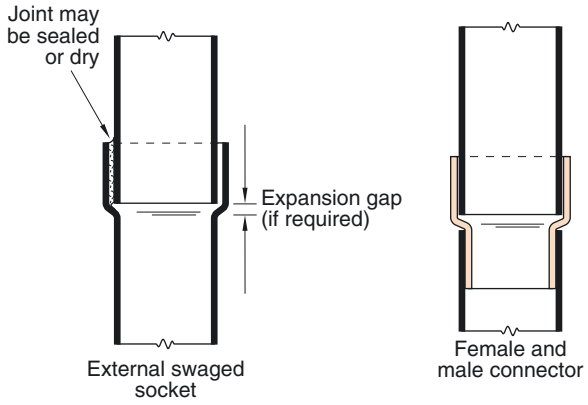


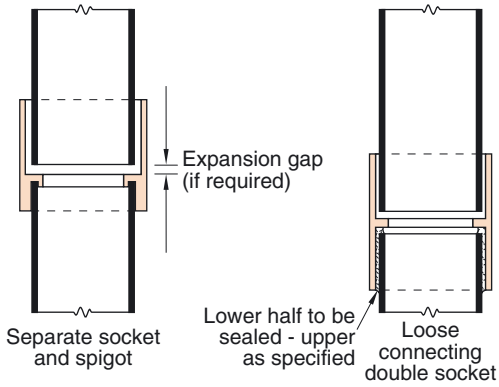
For proprietary expansion joint systems consult MGMA member companies

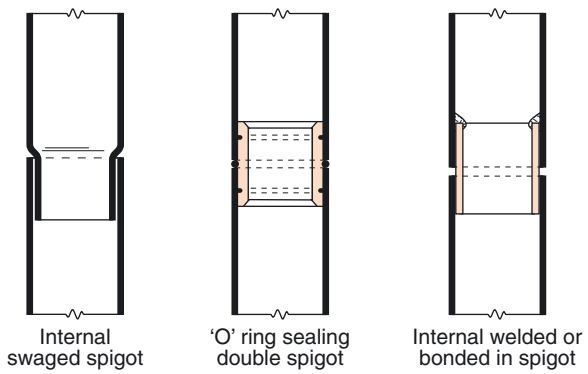
9.4 Typical downpipe joints - external

External sockets

Note: Sealed joints help to give best hydraulic performance

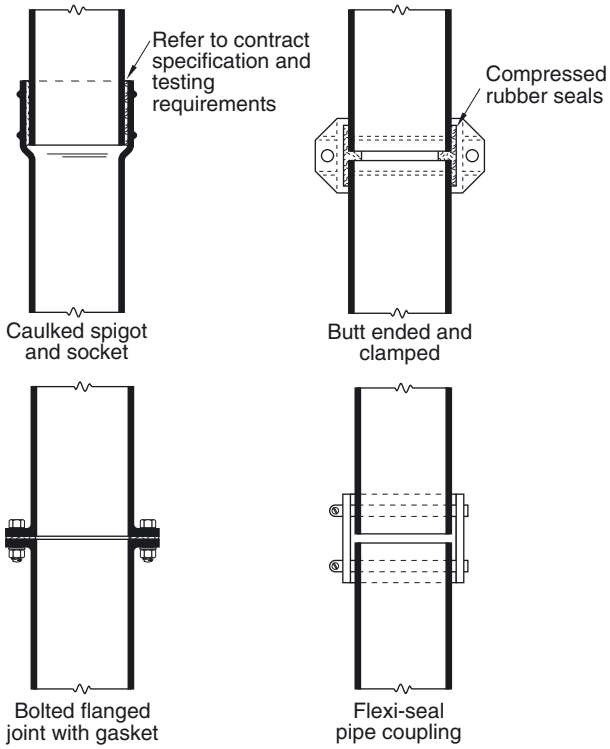






9.5 Typical downpipe joints – internal

Internal spigots



9.6 Jointing materials

9.6.1 Sealing materials

Sealant material	Gutters	Pipes
Low modulus silicone	✔	✔
EPDM ring seal		✔
EPDM strip seal	✔	
Cross linked butyl strip	✔	

9.6.2 Gutter jointing assembly

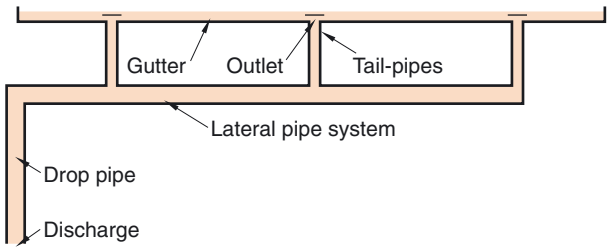
For galvanised materials it is recommended that M10 bolt, nut and washer assemblies with 6mm minimum sealant are used.

For aluminium over 2mm thick it is recommended that M8 bolt, nut and washers are used with a minimum sealant thickness of 3mm.

For gutters up to 2mm thick it is recommended that M5 or M6 bolt, nut and washers are used with a minimum sealant of 3mm. For rivets use recommended 4.8mm sealed rivets.

10 SIPHONIC ROOF DRAINAGE

The siphonic approach to roof drainage is to restrict the ingress of air into the system in order to induce the full-bore flow condition necessary for siphonic action. This is achieved by utilising specially designed gutter outlets in conjunction with smaller diameter pipework.



Typical components of a siphonic system

All siphonic roof drainage systems work in the same way. Air is excluded by a baffle plate over the outlet hole, which causes the pipes to run full of water. When the pipes are full of water the height difference between the gutter and the discharge point creates negative pressures in the pipe system, which draws water through the system. The greater the drop, the greater the potential energy available, and the greater the overall flow capacity of the outlet. However, if negative pressure becomes too great, then there is a risk of cavitation and pipe implosion. It is therefore essential that siphonic roof drainage design is carried out by a competent person using suitable software.

In the United Kingdom design practice is for a number of outlets to be joined together via small diameter tail pipes into a collector main which runs to a single discharge point; on larger buildings there may be many of these systems. A key factor is to ensure that the tail pipes are able to fill the collector pipe in a reasonable time. In the UK, a two-minute storm is used for roof drainage design, and so if the system takes three minutes to fill, it is effectively useless. One key point to remember is that all systems 'self-prime' and that there are no essential differences in technology between the various manufacturers.

In many larger systems, drainage is divided into a primary and secondary system. The primary system is designed to drain the day to day rainfall; in heavy storm conditions the secondary system will cut in and remove large volumes of water.

Because underground drainage will not be able to accept all the roof drainage water, these secondary systems will then discharge in car parks, for example thus reducing the extent of costly underground drainage networks.

Siphonic roof drainage is an effective method of draining large volumes of water from accessible gutters however, extra care should be taken where access may be restricted. The restrictive outlets and small diameter pipework associated with siphonic roof drainage systems can become easily blocked with debris such as leaves however, this problem can be overcome if a regular maintenance programme is adhered to.

For further information contact the Siphonic Roof Drainage Association at www.siphonic.org

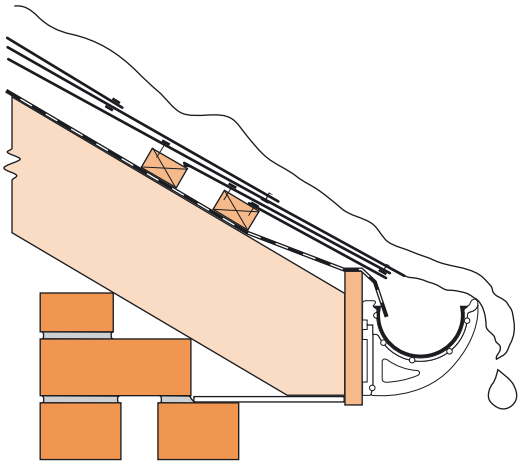
Siphonic system running across building at high level to single discharge point

Photo © Ross ADT

11 SPECIAL APPLICATIONS

Back outlets
Rise and fall angles
Radius gutters and pipes
Weir outlets
Electrical continuity
Debris protection
Anti-climb pipework
Vandal resistant pipework at ground or vulnerable levels
Overflow protection
Special gully connectors
Extended and special brackets
Purpose-made hopper heads
Special transition adaptors

For further information concerning special applications please consult an MGMA member company.



If there is a risk of sliding snow, adjust the bracket positions to prevent snow from hitting the front of the gutter.

12 SITEWORK

12.1 General

Responsible supervision and regular inspection is essential to ensure structural integrity, satisfactory performance, acceptable appearance and quality in general.

12.2 Handling and storage

All components must be handled carefully and positioned to ensure that no damage can occur.

Galvanised gutters should be stored with a space between them as specified in the manufacturer's instructions.

All materials should be kept in the wrapping until ready for fitting.

12.3 General checklist

Sitework requirements can vary considerably but the following is a useful checklist of what information is likely to be required on site:

1) Reference to manufacturer's instructions
Contract specification
Site-painting instructions
Water test requirements

2) Reference to required levels or falls.

3) Reference to required frequency of bracket/ fixing pitches.

4) Reference to positioning of gutter.

5) Reference to allowances required for thermal movement, if applicable.

6) Checking the lateral alignment of fixing background (packing pieces may be needed).

7) Prior to installation, confirm that the method of fixing, including the supporting structure, has been designed to accommodate loadings from wind, snow and maintenance traffic. If there is a risk of sliding snow, adjust the bracket positions to prevent snow from hitting the front of the gutter. (See left).

12.4 Health and safety

As in all building work, good safety standards are essential to prevent accidents. In accordance with the Health and Safety at Work Act and the Construction (Design and Management) or CDM Regulations, the building should be designed with safety in mind not only for the construction period itself, but also throughout the normal life of the building. This must include considering the safety of personnel involved in maintenance and repair.

This information must be detailed in a safety file prepared by the planning supervisor (using information supplied by the designer) and passed on to the client at handover.

If in any doubt about safety issues, then further guidance can be obtained from the construction section of the local Health and Safety Executive.

13 INSPECTION AND MAINTENANCE

Metal guttering systems are designed and manufactured to give many years of reliable service and to achieve this a regular inspection and maintenance programme is required.

The maintenance checklist should include the following:

1 All gutters should be inspected twice yearly and any leaves, debris etc need to be removed by sweeping away from the outlets.

NB In areas with large numbers of trees or other sources off airborne debris, this cleaning frequency may need to be increased.

2 Galvanised gutters should be painted after the initial weathering period.

3 Bitumen coating requires regular re-coating (apart from local repair when found during inspection). Refer to manufacturer's recommendations.

4 Any damage to galvanised surfaces should be repaired with a good quality zinc-rich 'cold galvanising' paint.

5 The surface finish should be cleaned regularly.

6 Periodic checks on security fixings and joints.

7 Regular inspection for signs of deterioration and any areas of corrosion damage should be repaired in accordance with the manufacturer's instructions.

The above maintenance programme should be incorporated in the maintenance manual supplied by the manufacturer.

MGMA TECHNICAL PAPERS

Metal Gutters: The Guide

Information data leaflet No 1:	*Installation guide*
Information data leaflet No 2:	*Focus on cast iron rainwater goods*
Information data leaflet No 3:	*Rainwater drainage design EN 12056:3-2000*
Information data leaflet No 4:	*Focus on seamless aluminium pre-painted gutter systems*
Information data leaflet No 5:	*Focus on industrial guttering*
Information data leaflet No 6:	*Siphonic roof drainage*

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