

Reconstructed or artificial stone – support and restraint

Particular consideration should be given to the support of 'art' or 'recon' stone features. Support may be at normal soft joint level on the building, or it may be a special support for a particular feature, for example, a cornice. Halfen manufacture folded angle cleats and HMA bracket cleats suitable for the support of 'art' or 'recon' stone features.

HMA bracket cleats

HMA bracket cleats are manufactured from grade 304 stainless steel. The brackets, when used in conjunction with horizontal cast-in channel, provide both horizontal and vertical adjustment to ease site installation. They also minimise cold bridging and provide a positive drip against water ingress.

The illustrations below show popular design variations and dimensions of typical HMA bracket cleats for guidance.

However, Halfen will design cleats to suit individual design and loading requirements on a project basis.

Fixing to substrate

HMA cleats are best fixed to cast-in channel, but can be fixed using site-drilled bolts, if cast-in channel has been omitted. Alternatively, surface-fixed Halfen channel or bolting direct to structural steel may be used. In all cases care must be taken to ensure that the heel of the bracket is fully supported.

Folded angle cleats

The use of stainless steel plate, folded to form angle cleats and fixed to the substrate through a hole or slot in the back leg, will provide adequate support in many cases. This method of support, however, does not provide the same degree of adjustment as HMA angle cleats. To increase the adjustability when using folded angle, Halfen recommend that cleats be fixed to the substrate through a horizontal

slot in the back leg and to a length of 41/22 toothed channel cast-in vertically. This will then permit some degree of horizontal and vertical adjustment.

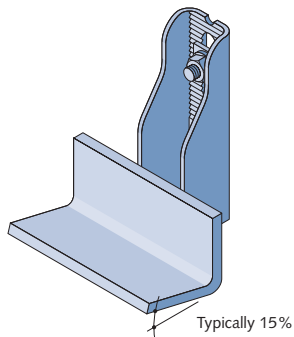
Folded angle cleats can also be fixed using site-drilled resin anchors or hexagonal headed nuts and bolts depending on the substrate, and in this case a welded serrated patch provides vertical adjustment.

Design considerations

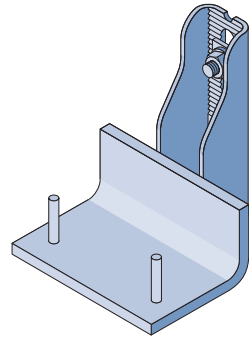
Support brackets and cleats can be supplied with the supporting leg kicked up or fitted with dowel(s) providing restraint as well as support (see illustrations below).

Support can be provided by two individual cleats per stone or cleats spanning vertical joints supporting adjoining stones (see illustrations below).

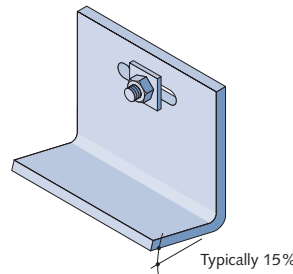
Continuous angle with or without HMA brackets can be supplied to span openings.



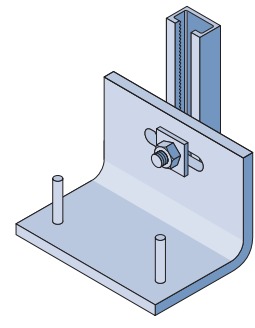
HMA bracket cleat with kicked-up angle



HMA bracket cleat with restraint dowel(s)



Folded angle cleat with kicked-up angle



Folded angle cleat with restraint dowel(s) bolted to 41/22 toothed channel

HMA bracket cleats

(All to order)

Typical dimensions (mm)

T = 6 or 8

X = 140

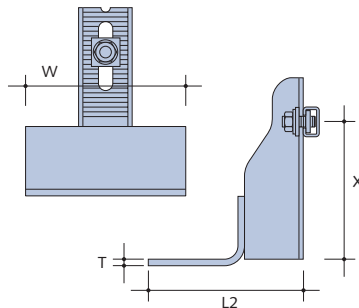
(±25 vertical adjustment)

L2 = 100 to 200

W = 150 individual (2 per stone)

or 250 shared (at vertical joint)

Fixing bolt diameter = M12



Folded angle cleats

(All to order)

Typical dimensions (mm)

T = 8, 10 or 12

L1 = 125 to 200

L2 = 100 to 150

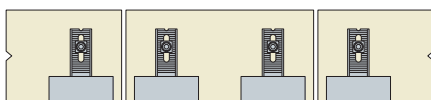
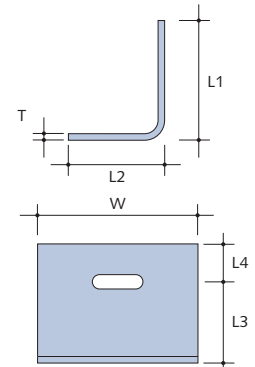
L3 = L1 - L4

L4 = 30 to 40

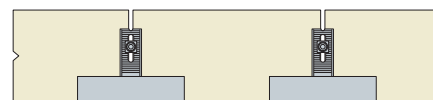
W = 150 individual (2 per stone)

or 250 shared (at vertical joint)

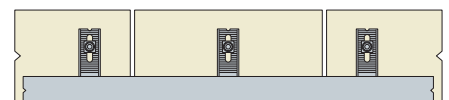
Fixing bolt diameter = M16



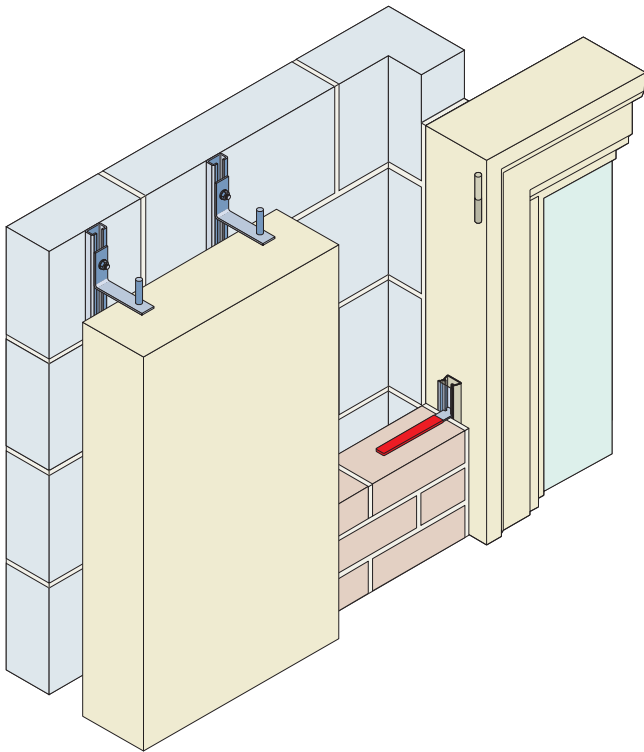
Individual bracket cleats (2 per stone)



Shared bracket cleats

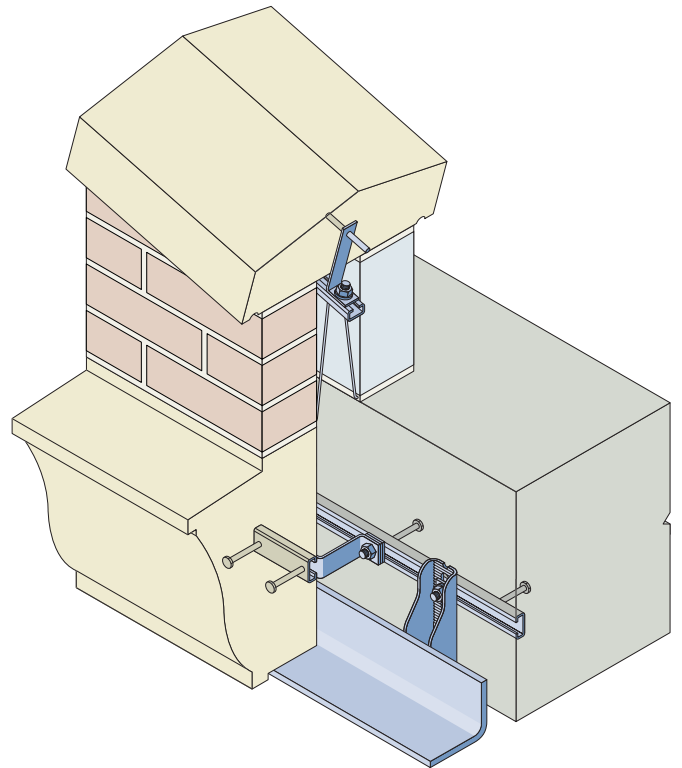


Continuous angle (typically over openings)



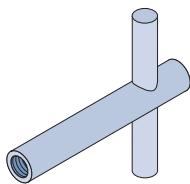
Restraint for reconstructed stone pilaster

Illustration also shows reconstructed stone window jamb tied to head with dowel and to outer skin with de-bond tie.

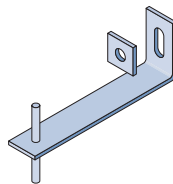


Support and restraint for reconstructed stone cornice

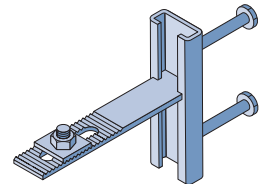
Illustration also shows restraint for coping using a cramp in channel 28/15, i.e. cramp adjustable to locate in stone joint.



Cast-in sockets provide a strong safe point fixing in pre-cast units. See catalogue 'Pre-cast Insert Systems'.



Restraint cramps or dowels can be any shape to order. They are normally manufactured out of 30 x 3 mm material.



For large units restraint cramps are designed for bolting to the pre-cast concrete. Normally 6 mm material is used. For details please consult Halfen Limited

Design service

The technical data tables included in this brochure are designed to provide a quick and easy guide for designers and specifiers. If further information is required, however, please do not hesitate to contact the Halfen Technical Advisory Service.

Testing

Testing procedures have been developed using channels cast into concrete, and all Halfen channel systems have been fully tested. For details, please consult Halfen Limited.

Quality/service

Halfen are committed to meeting the requirements of EN ISO 9001: 2000 and operate procedures accordingly.

The products are also available as part of the NBS Plus scheme.

Product improvement and development

Halfen's commitment to continual product development may result in products being amended or withdrawn. However, Halfen always attempt to keep designers of current projects aware of any relevant changes.

