

## FLEMISH BOND

Since its origins in 17th century England from influences of the buildings in the Low Countries, Flemish bond brickwork has been a very popular and attractive choice of bond pattern. Indeed from around 1700 onwards, Flemish bond wholly replaced English bond. From the grand buildings of the past 300 years, through to the humble terrace, Flemish bond continues to be specified today and adds a timeless aesthetic to masonry of any application. It is however, without careful consideration and setting out, a potentially difficult bond to perfect and maintain in the run of courses.

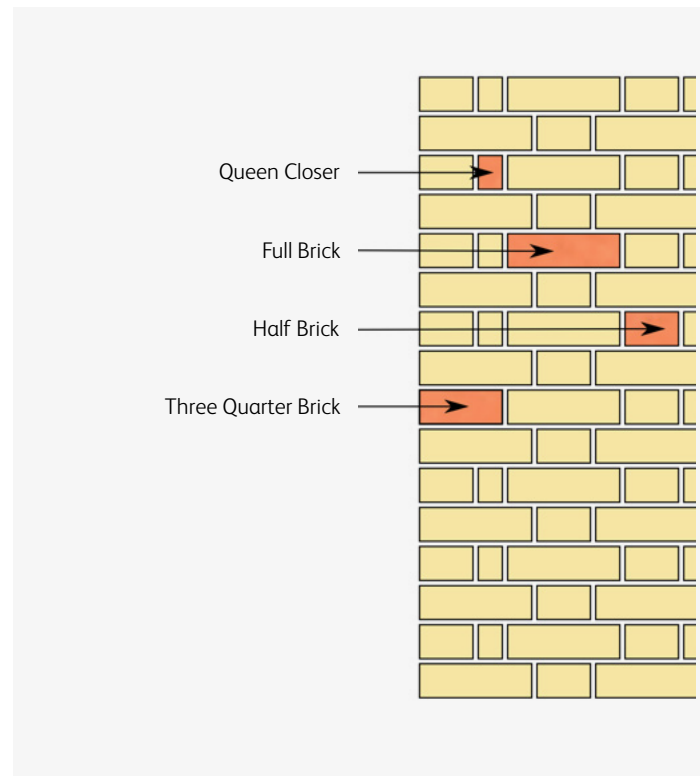
The inclusion of specifically cut bricks, such as bats, queen closers and the detail needed regarding reveals, can add this dimension of difficulty to the bond, as opposed to standard stretcher bond.

Flemish Bond is not as strong as English bond, but is generally considered to be more visually attractive. The bond can be adapted to suit thicker walls - most houses built in Flemish bond will have walls one brick thick (225mm or 9 inch). Some walls, built in cavity construction, used 'snapped' headers to give the appearance of Flemish bond but the external leaf is still a half-brick thick. This was not unusual in the 1920s and 1930s but is seldom used today because of cost.

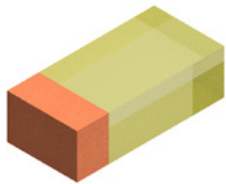
However, this guide will explain that with diligent setting out, considered measurement and design attention, Flemish bond is very much achievable.

### DESIGN AND DETAILING-MAINTAINING THE BOND

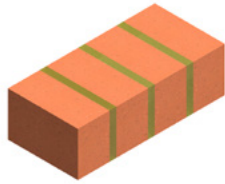
The traditional Flemish bond has alternate stretchers and headers on every course, with the headers centred over the stretchers underneath. Flemish bonds can be replicated in the half-brick outer leaf of a cavity wall by using whole bricks as stretchers, while the headers are created using half bricks called bats or snap-headers. To make the bond work with the course above and below additional bricks known as queen closers are required. The closer is effectively a quarter brick and it is usually positioned after the first header.



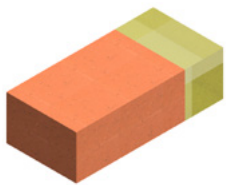
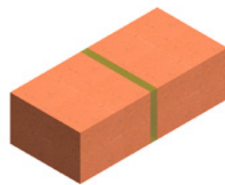
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QUARTER BRICK "QUEEN CLOSER"



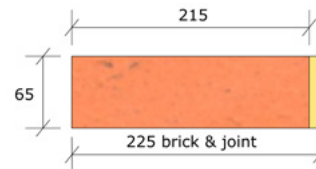
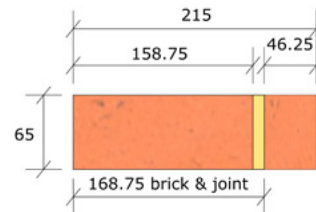
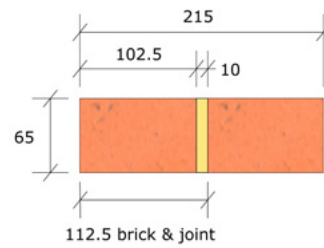
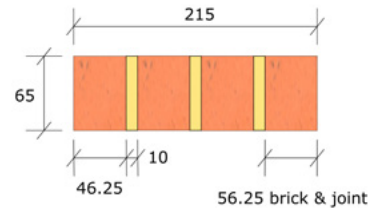
HALF BRICK



3/4 BRICK

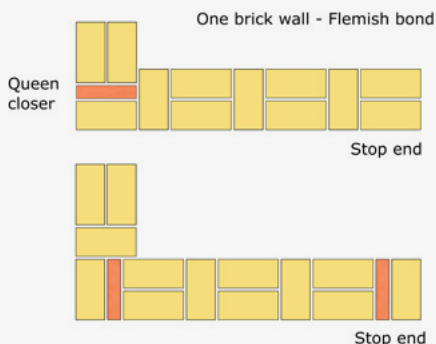


FULL BRICK

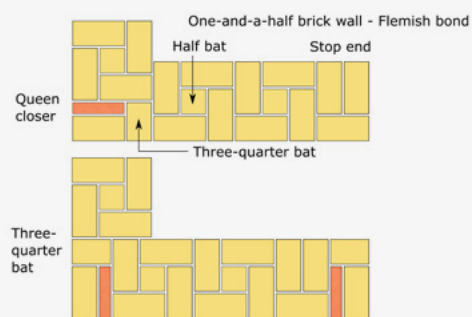


The left hand image shows the 'odd' and 'even' courses of a one brick wall in Flemish bond; the right hand image shows a one-and-a-half brick wall (this requires half and three-quarter bats to maintain the bond). The queen closers are shown in a darker colour. The left hand image shows the 'odd' and 'even' courses in plan of a one brick wall in Flemish bond.

## PLAN BASE COURSE

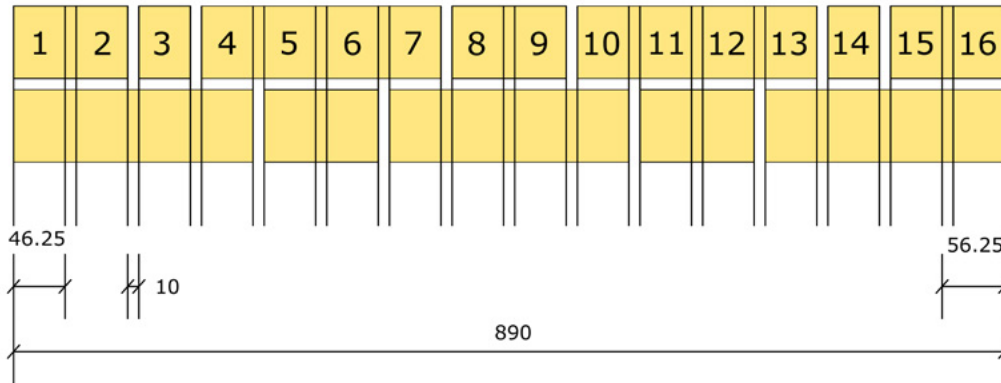


## PLAN BASE COURSE



# FLEMISH BOND

Therefore, when designing Flemish bond it is best practice to ensure any lengths are set out to a dimension divisible by the quarter (56.25mm with joint, 46.25mm without). An example below shows a length of 890mm. The bottom course consists of stretcher, header, stretcher header and stretcher. The course above header, queen closer, stretcher, header, stretcher, queen closer and header to create the quarter bond.



Below is a table showing standard dimensions that work in Flemish Bond and the net quantities in a square metre for scheduling assistance.

NUMBER OF BRICKS		CO+ JOINT	CO (COORDINATING SIZE)	CO- JOINT
1 Stretcher	0 Header	235	225	215
1 Stretcher	1 Header	347.5	337.5	327.5
2 Stretchers	1 Header	572.5	562.5	552.5
2 Stretchers	2 Headers	685	675	665
3 Stretchers	2 Headers	910	900	890
3 Stretchers	3 Headers	1022.5	1012.5	1002.5
4 Stretchers	3 Headers	1247.5	1237.5	1227.5
4 Stretchers	4 Headers	1360	1350	1340
5 Stretchers	4 Headers	1585	1575	1565
5 Stretchers	5 Headers	1697.5	1687.5	1677.5
6 Stretchers	5 Headers	1922.5	1912.5	1902.5
6 Stretchers	6 Headers	2035	2025	2015
7 Stretchers	6 Headers	2260	2250	2240
7 Stretchers	7 Headers	2372.5	2362.5	2352.5
8 Stretchers	7 Headers	2597.5	2587.5	2577.5
8 Stretchers	8 Headers	2710	2700	2690
9 Stretchers	8 Headers	2935	2925	2915
9 Stretchers	9 Headers	3047.5	3037.5	3027.5
10 Stretchers	9 Headers	3272.5	3262.5	3252.5
10 Stretchers	10 Headers	3385	3375	3365
11 Stretchers	10 Headers	3610	3600	3590
11 Stretchers	11 Headers	3722.5	3710.5	3702.5
12 Stretchers	11 Headers	3947.5	3937.5	3927.5
12 Stretchers	12 Headers	4060	4050	4040
13 Stretchers	12 Headers	4285	4275	4265
13 Stretchers	13 Headers	4397.5	4387.5	4377.5
14 Stretchers	13 Headers	4622.5	4612.5	4602.5
14 Stretchers	14 Headers	4735	4725	4715
15 Stretchers	14 Headers	4960	4950	4940
15 Stretchers	15 Headers	5072.5	5062.5	5052.5
16 Stretchers	15 Headers	5297.5	5287.5	5277.5
16 Stretchers	16 Headers	5410	5400	5390
17 Stretchers	16 Headers	5635	5625	5615
17 Stretchers	17 Headers	5747.5	5737.5	5727.5
18 Stretchers	17 Headers	5972.5	5962.5	5952.5
18 Stretchers	18 Headers	6085	6075	6065
19 Stretchers	18 Headers	6310	6300	6290
19 Stretchers	19 Headers	6422.5	6412.5	6402.5
20 Stretchers	19 Headers	6647.5	6637.5	6627.5
20 Stretchers	20 Headers	6760	6750	6740
21 Stretchers	20 Headers	6985	6975	6965
21 Stretchers	21 Headers	7097.5	7087.5	7077.5

HALF BRICK THICK (102MM) assuming half bricks cut on site and best half selected			ONE BRICK THICK (215MM)		
Total	Stretchers	Headers	Total	Stretchers	Headers
Alternate bricks, header/stretcher, in each course					
80	40	40	120	80	40

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As mentioned before, a design feature of Flemish bond is the position of the Queen Closers. In the photos below, you can see the headers and queen closers next to the windows. Alternatively, a three quarter brick could replace the header and closer, but generally, this is not thought to be as attractive.



### MORTAR

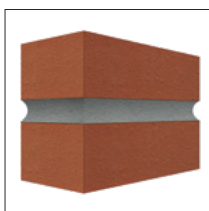
Mortar specification for any bond of brickwork is critical to the long-term durability of masonry and, with such an aesthetically pleasing bond as Flemish, the mortar detail plays a critical part in emphasising the intricate detail and workmanship. The correct designation is crucial and the table below is our recommend designations;

DESIGNED MORTARS (not provided to a prescribed mix) compressive strength class	EXPOSURE CATEGORY	PRESCRIBED MORTARS (proportions of materials by volume) not tested for strength				
		Mortar designation	Portland cement or Sulfate resisting Portland cement and lime, with or without air entraining additive	Masonry cement containing Portland cement and lime in approx 1:1 ratio and air entraining additive	Masonry cement containing Portland cement (min 75%) and inorganic materials other than lime and air entraining additive	Portland cement or Sulfate resisting Portland cement and an air entraining additive
M12	Severe	(I)	1:0 to ¼:3	–	–	1:3
M6	Severe	(II)	1:½:4 to 4½	1:3	1:2½ to 3	1:4
M4	Moderate	(III)	1:1:5 to 6	1:3½ to 4	1:4 to 5	1:5 to 6
M2	Passive	(IV)	1:2:8 to 9	1:4½	1:5½ to 6½	1:7 to 8

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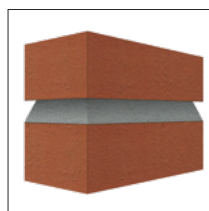
As mentioned, the mortar joints not only enhance the durability of finished masonry, but affect aesthetics too. The choice of joint can be crucial as it is dependant very much on brick specification and expected exposure to the elements. Recessed mortar joints may be attractive paired with certain brick types, however they are only recommended for sheltered regions as defined in the BDA Guide to Severely Exposed Brickwork. A bucket handle joint is the most durable profile and careful tooling can create a beautiful finish.

### GRADES OF EXPOSURE JOINTS



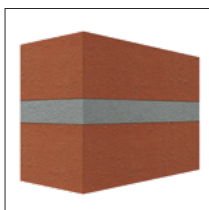
#### **CURVED (Bucket Handle)**

This joint gives an improved appearance over a flush joint, with little reduction in its strength. Owing to the compressing of the joint and the superior bond, it has good weather resistance and is suitable for all grades of exposure.



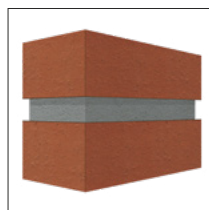
#### **STRUCK OR WEATHERED (Weather-struck)**

This produces a contrasting effect of light and shade on the brickwork. Such joints, when correctly formed, have excellent strength and weather resistance and are suitable for all grades of exposure.



#### **FLUSH**

This joint gives maximum bearing area and is often favoured when coarse textured bricks are used. With some brick types, the finish may appear a little irregular. Suitable for moderate and sheltered exposures as the mortar joint has not been compressed by the finishing tool.



#### **SQUARE RECESSED (raked)**

This can produce interesting articulated joints, but weather resistance and strength will be considerably less than with other joints. Use only with frost resistant bricks in sheltered exposure conditions. The recess should not exceed 3-4mm and is not recommended with full fill cavity insulation.