Practical Architecture

How to detail a wall plate: a sift through the guidance

Notes on reference documents

The documents and websites listed below were referenced in compiling the post titled ‘How to Detail a Wallplate: A sift through the guidance’.

Relevant information given in each reference is summarised together with some commentary.

Where the information is publicly available online, relevant links are given. British Standards are protected by copyright and a paywall.

Approved Document A to the Building Regulations

The relevant Building Regulation is A1. This states that the loads shall be transferred safely to the ground without causing any problems.

The Approved Document permits the use of the documents listed in Section 1 (which refers to various British Standards, including BS8103-1, -2, -3 see below), or the use of Sections 2-4 in the Approved Document.

Section 2 of the Approved Document does not specifically refer to wall plates and does not give guidance on their sizing or fixing details. A wall plate is, however, shown in Diagrams 16c) and d) which illustrate vertical restraint straps.
It requires the installation of 1m long 30x5mm tension strap at max 2m ctrs.

Note that the vertical restraint straps are for holding down the roof structure in the event of wind uplift but they are shown in diagrams with the title ‘Lateral Restraint’ which is confusing.

Also, a flat roof is shown with the wall plate strapped and not the joists and a pitched roof is shown with the rafters strapped and not the wall plate. This is confusing because any combination of strapping the wall plate or joist or rafter is possible provided that the members are suitably connected together .

https://www.gov.uk/government/publications/structure-approved-document-a

BS 8103-1: 2011 Structural Design of Low-Rise Buildings Part 1

Section 4.4 gives guidance on the requirements for strapping roofs to walls.

BS 8103-2: 2013 Structural Design of Low-Rise Buildings Part 2

Section 7 states that roofs should be capable of transferring lateral forces from walls to buttressing walls and be fixed in accordance with BS8103-1.

BS 8103-3: 2009 Structural Design of Low-Rise Buildings Part 3

Section 4.1.6 States that wall plates should be from timber species listed in Table 1. This includes references to timber species required to conform with strength designation C16.

Section 6.2.4 Gives guidance on wall plate sizes, lengths and jointing. It states that a wall plate should be a minimum of 70mm wide and goes on to note:

"In England & Wales it is normal for wall plates to have a basic thickness of 38mm, whilst in Scotland thicknesses of 25mm or 47mm are typical. These thicknesses are acceptable for this Part of BS 8103."

It requires min 100mm long half-lap joints with 2no nails at joints in the wall plate and at corners.

BS 8000-5: 1990: Workmanship on Building Sites Part 5

Section 3.2.4 Wallplates

a) Use one piece for lengths less than 3m
b) Above 3m long, use min number of pieces, with smallest piece across 3no joists or trusses.
c) Join with 100mm lap joints twice nailed.
d) Fix in accordance with Table 17

Note: Only use holding down straps on wall plates if joist or truss is fixed to wall plate, otherwise strap joist or truss.

Table 17 has two options for fixing the wall plate in location only:

1. Nailing with 100mm masonry nails at 1m ctrs, with wall plate on mortar bed and only for blockwork.

2. Strapping using light gauge strap extending min 150mm down face of wall fixed with masonry nails.

And one option for fixing against wind uplift:

1. Use heavy gauge strap of correct length, fixed at specified spacings, plus and screw to wall at max 150mm ctrs of strap.

NHBC Standards 2020

NHBC Standards 2020 states that wall plates should be:

- bedded to line and level
- fixed using nails or straps
- a minimum of 3m or extend over 3 rafters or trusses
- joined using half-lap joints, including at corners
- 38x100mm or in accordance with local practice

It refers to trussed rafters and says that where wind uplift is not an issue, these can be fixed to the wall plate with skew nails. It doesn't mention a specific fixing for cut rafters.

Where wind uplift is an issue it requires the use of 30x2.5mm thick straps at max 2m ctrs fixed to the wall.

https://nhbc-standards.co.uk/7-roofs/7-2-pitched-roofs/7-2-6-wall-plates/

Designing Buildings Wiki

Designing Buildings Wiki includes just a couple of short descriptive paragraphs on wall plates.

It describes a wall plate as a 'load-bearing structural member', which is misleading. It does bear load but it is not installed for that purpose.

It goes on to say that a wall plate:

'… distributes the load exerted by the roof structure down through the walls without creating pressure points where each rafter meets the wall, and also acts to prevent wind uplift'.

The reality is that, in the case of masonry, the wall doesn't need the load to be spread and that isn't what the wall plate is for, and it is the holding down straps which resist wind uplift and not the wall plate.

https://www.designingbuildings.co.uk/wiki/Wall_plate

Barry (1999 7th edition). The Construction of Buildings Volume 1.

Barry states that the wall plate should be bedded on mortar and that it provides a support and fixing for the rafters and that it spreads the load into the wall.

It states the wall plate size as being 'usually 75x100mm'.

Chudley, R, Greeno, R, et al (2011 5th edition). Construction Technology.

Chudley & Greeno says that wall plates:

"…provide the bearing and fixing medium for the various roof members, and distribute these evenly over the supporting walls; they are bedded in cement mortar…and strapped down using galvanized straps and stainless steel screws."

They include sectional drawings that label the wall plates as '100x50 wall plate'.

Suppliers/manufacturers: Simpson Strongtie, Twistfix, Expamet

The following company websites were consulted:

https://www.twistfix.co.uk/bat-straps
https://tecoproducts.co.uk/products/restraint-straps-waterbar-banding/traditional-restraint-straps/
https://www.expamet.co.uk/literature-downloads/

Rev 1: August 2023 -
Various typos corrected, and note added to Designing Buildings Wiki section.