



## TECHNICAL GUIDANCE

# FALLS AND DRAINAGE FOR SINGLE PLY ROOFS

ENSURING THAT CLIENTS OBTAIN  
HIGH QUALITY POLYMER-BASED  
SINGLE PLY ROOFING, THROUGH A  
PARTNERSHIP OF QUALITY ASSURED  
MANUFACTURERS AND CONTRACTORS

## TECHNICAL GUIDANCE

### FALLS AND DRAINAGE FOR SINGLE PLY ROOFS

Some of the advertising by competitors is as old as Shakespeare: “To fall or not to fall, that is the question” they suggest. In fact, a flat roof must never be flat, which is why they are called ‘low slope’ in the USA.

Flat roofs are defined in BS 6229:2003 ‘Code of practice for flat roofs with continuously supported coverings’ as ‘a roof having a pitch not greater than 100 to the horizontal’. Whilst it could correctly be argued that a roof with a zero or nominal fall has a pitch not greater than 100, this is ruled out by Table 6 of the Standard which requires a ‘minimum finished fall at any point’ of 1:80 for flat roofing membranes.

The standard goes further to state that “In order to ensure achieving these finished falls allowance should be made for deflection of the structural members and decking under dead and imposed loads and also for construction tolerances’ and ‘in the absence of a detailed analysis, a fall of twice the minimum should be assumed for design purposes.’

There is consistency on this requirement across the spectrum of technical manuals, from SPRA, NFRC1, NHBC2 and Premier Guarantee. This is reinforced in relevant BBA3 Certificates by the same definition of flat roofs and the requirement for falls. Thus failure to comply with installing a roofing system in accordance with the above requirements may nullify a product manufacturer’s warranty.

Ponding water should be avoided because:

- In the event of damage, water ingress to the interior will be increased.
- It may cause progressive deflection of the deck, 15 mm ponding on a 500m<sup>2</sup> roof has a dead load of 7.5 tonnes!
- It encourages the deposition of dirt and leaves, which can be unsightly and may obstruct outlets and/or become a slip hazard.
- It can lead to thermal stresses, algae, moss and mould growth and other vegetative growth which may decrease the life expectancy of roof finishes.
- Ice may become a slip or wind blow hazard.
- It may contravene the terms of the warranty for the waterproofing membrane.

#### HOW BEST TO CREATE FALLS

Fundamentally the primary function of any roof is to exclude water, so it is important to consider how best to direct this into the drainage system.

The options are:

- Create in the structure. Ideal for simple layouts and known deflections and tolerances. Mitred falls may be more difficult.
- Create in the deck.
  - Screed for mitres and low tolerances.
  - Metal decking packed out to form mitres.
  - Firrings and counter battens for timber.
- Create in the insulation. Tapered insulation enables complex layouts and low tolerances. There may be instances (especially in refurbishment projects) where the addition of a tapered insulation scheme may, at the high point interfere with/obscure an existing window sill or damp proof course. If in any doubt always consult the insulation or single ply membrane manufacturer.

#### GUTTERS

Internal gutters are rarely necessary these days. Avoid them wherever possible in new build and design them out of refurbishment because they introduce unnecessary complexity and risk. It is always difficult to create falls in box gutters whereas mitred falls can achieve this more simply.

Note: there is a footnote to Table 6 in BS6229:2003 which states that ‘For certain specialist systems designed for buried applications, such as garden roofs, podia, and some car parks, specific reference should be made to the manufacturer’s documented advice and British Board of Agrément certification.’ SPRA considers that:

- Roofs do not fit into the above categories (most UK green roof designs include a fall).
- The reasons for avoiding ponding apply equally to all technologies for continuous waterproofing so there is no logic in excluding certain types.

SEE OVERLEAF FOR FALLS CHECKLIST

<sup>1</sup> National Federation of Roofing Contractors

<sup>2</sup> National House Building Council

<sup>3</sup> British Board of Agrément

1. Project title: \_\_\_\_\_ Ref: \_\_\_\_\_
2. Roof location: \_\_\_\_\_ Area: \_\_\_\_\_
3. Construction type: Warm  Cold  Inverted  Green/biodiverse
4. Attachment of components:

| COMPONENT            | MECHANICALLY FASTENED | ADHERED | BALLASTED |
|----------------------|-----------------------|---------|-----------|
| Single ply membrane  |                       |         |           |
| Insulation layer 1   |                       |         |           |
| Insulation layer 2   |                       |         |           |
| Vapour control layer |                       |         |           |

5. Is information available regarding deflection of structural members/decking under load?  
Yes  No  (if not the design should be for 1:40 to achieve 1:80)
6. Has consideration been given to achieving cross-falls?  
Yes  No
7. Does the client have specific requirements regarding falls?  
Yes  No
8. Does the building insurer have specific requirements regarding falls?  
Yes  No
9. Do warranty clauses have specific requirements regarding falls?  
Yes  No
10. Do the designed falls conform to the membrane product's BBA certification?  
Yes  No
11. Has a maintenance regime been discussed/agreed?  
Yes  No
12. Does the introduction of tapered insulation create interface clashes (e.g. DPC or cavity tray, planning height restriction; abutment to adjacent roof)?  
Yes  No
13. If the roof design includes large details such as plinths or rooflights which could obstruct drainage, has the drainage design been modified or has the client been made aware of the risk of temporary ponding?  
Yes  No
14. REFURBISHMENT: are the existing falls adequate? (i.e. is there evidence of persistent ponding water)  
Yes  No
15. Design falls

| DESIGNED IN WHICH ELEMENT | 1:40 | 1:60 | 1:80 | OTHER - 1: | CROSS-FALLS | COMMENTS |
|---------------------------|------|------|------|------------|-------------|----------|
| insulation                |      |      |      |            |             |          |
| Screed                    |      |      |      |            |             |          |
| Structure                 |      |      |      |            |             |          |
| Other                     |      |      |      |            |             |          |
| Existing                  |      |      |      |            |             |          |

16. Notes:
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