



Tyvek®

DUPONT™ TYVEK®

Tyvek® roofing underlays - Wind uplift resistance

“Hurricane-force winds gusting to over 100 mph left a swathe of damage across the north of Britain overnight, bringing down trees and power lines and damaging buildings.”

As we progress through the new millennium, we are becoming accustomed to seeing stormy weather images on our TV's and reading news articles such as the one above. Most homeowners at some time will have experienced some sort of damage resulting from extreme weather conditions. Wind damage to roofs and the associated damage caused by loose tiles is common in the UK.

Whether this can be attributed to climate change or not the incidence of such events is becoming more common.

A system of colour coded weather warnings has been established by the MET office to give the general public time to prepare for severe or hazardous weather. A guide which would help to limit storm damage to our homes would therefore make good sense - this is where the new BS5534 document steps in.



BS5534: 2014

For nearly 40 years, anyone engaged in the construction of a pitched roof in the UK has been able to draw upon the recommendations within BS5534. Whilst this document forms the Code of Practice for slating and tiling, its guidance covers many other aspects of pitched roofing, the materials used and the methods employed. The standard does not take the form of a legal document, but for many it could be regarded as 'the roofers bible.'

The latest revision to BS5534, effective from March 2015 is a radical update to the standard with a realistic and future-proof emphasis on roof security and overall safety. The document addresses in detail the specification of mortar bedding, battens, flashings, structural sheathing and underlays as well as a specific focus on fixings.

BS5534: 2014 also includes guidance associated with UK meteorological data, such as exposure to driving rain and a noticeable concentration on the effect of wind pressures on roofing components. Roofing underlays have not been left out and now after many years of debate specific limits on wind uplift resistance have been imposed. By following the guidance and advice given in the standard we can now realistically design and build our homes in a way to better prepare them for high winds and stormy conditions. This is very relevant as the majority of damage reports come from domestic dwellings, where the average cost of damage is at least £300 million per year.

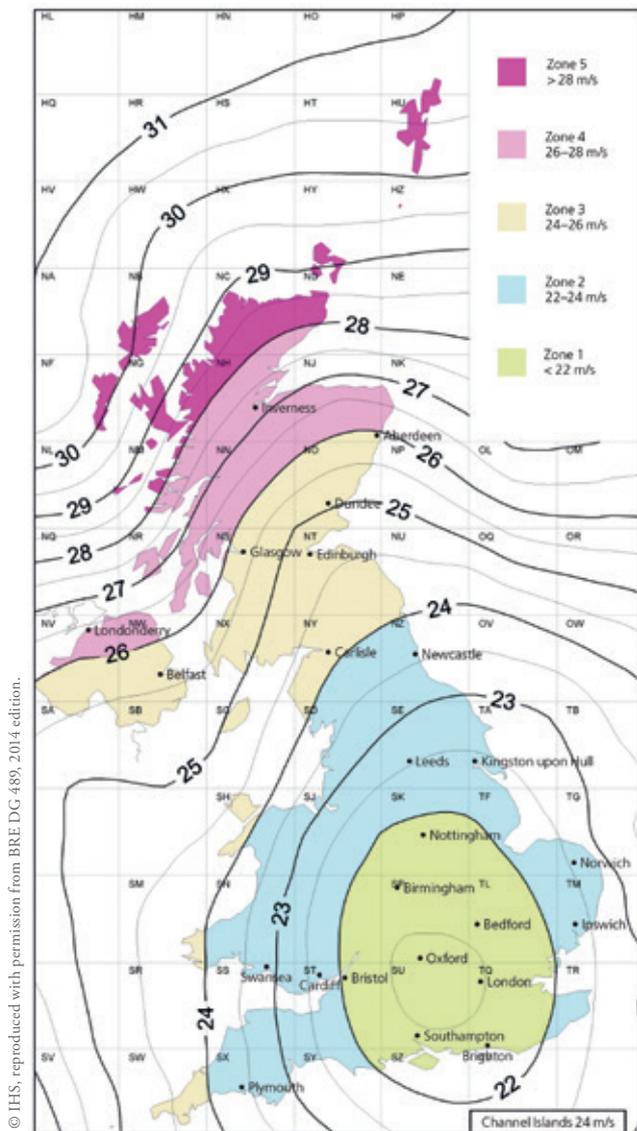
Extreme wind conditions have in the past resulted in entire roofs being lifted off a building. New building codes will have reduced the risk, but these roof failures demonstrate the strong lifting forces that can be exerted upon a roof when wind passes overhead. The suction effect of negative wind pressure, such as on the leeward side of a building can result in tiles or slates being dislodged. BS5534: 2014 has gone some way to safeguard against this risk with its new recommendations, not just with new fixing requirements for slates and tiles, but also for the underlay.

The emphasis on underlays

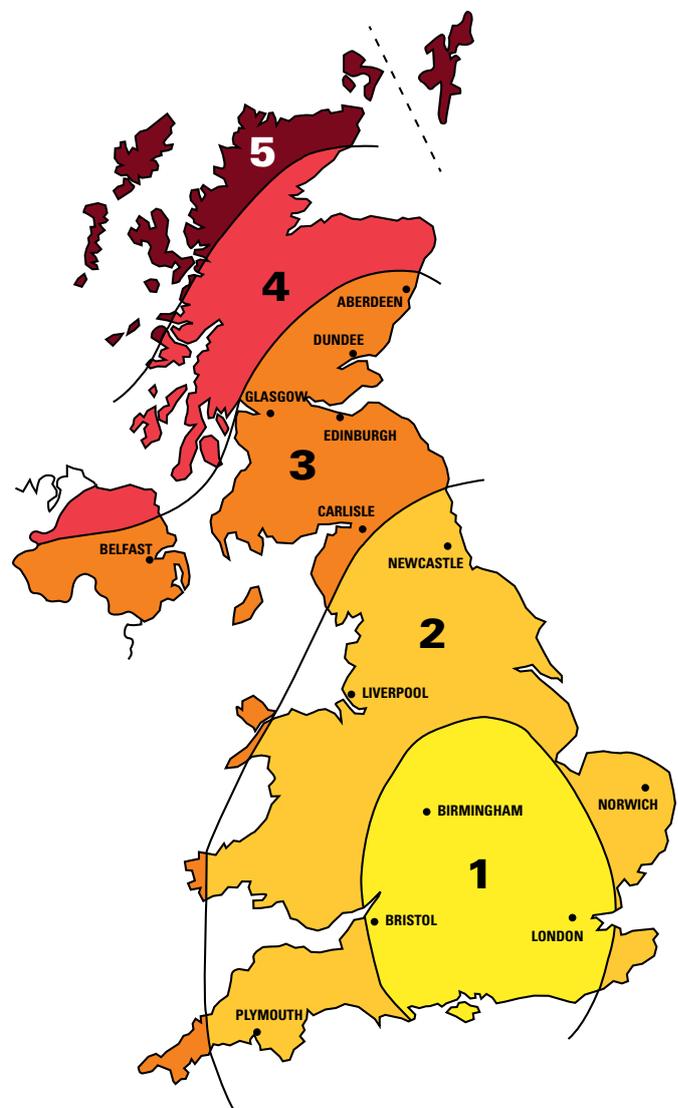
The benefits of a roof underlay positioned beneath a primary water shedding layer have been realised for many years. Even before a pitched roof is completed, a quickly installed underlay will keep the construction dry before the outer layers are in place. Once the roof is completed, the underlay will act as a back-up to the tile or slate covering by providing a secondary water shedding function. The underlay is also expected to resist a significant proportion of wind load imposed on the outer covering and it is this function that is now being addressed.

The potential effect of an underlay subjected to excessive wind loading is for it to balloon upwards, toward the tile or slate covering. If the wind resistance of the underlay is inadequately low or it has been installed with excessive drape, it could balloon to such an extent that it impacts upon the tiles or slates, causing them to dislodge. The tiling batten will help to restrain the underlay to an extent, but in the case of large format tiles where the batten gauge is sizeable the underlay deflection would be more significant.

A greater responsibility has therefore been placed on the underlay to cope with these wind forces and it is appropriate for BS5534: 2014 to set the parameters. The Code of Practice now also includes a new annex which describes the procedure for assessing an underlays' wind uplift resistance to a more stringent level than was previously required. When tested to the new standard the recorded values will determine the product's suitability for use in certain areas of the country. The document consequently includes a UK wind zone map, derived from a map of wind velocities, which correlates with EN 1991-1, the relevant Eurocode concerning Wind Actions.



Wind velocity map/chart



Annex A: Wind zone map

The designated wind zones range from Zone 1 with moderate conditions to Zone 5 that typically encounter higher wind speeds.

Wind zones according to Annex A

These minimum wind resistance requirements are applicable for building projects where positive wind pressure from beneath is limited by a continuous internal lining. The ceiling in this case will consequently be considered 'well sealed' which for today's energy efficient modern buildings should be regarded as standard practice. The figures are for an underlay laid with a drape of 10mm and a batten gauge of 345mm.

Zone 1: 820Pa

Zone 2: 975Pa

Zone 3: 1150Pa

Zone 4: 1330Pa

Zone 5: 1600Pa

The following conditions apply:

- ridge height not greater than 15 m;
- roof pitch between 12.5° and 75°;
- site altitude not greater than 100 m;
- no significant site topography;

Additional values according to specification of internal linings and fenestration:

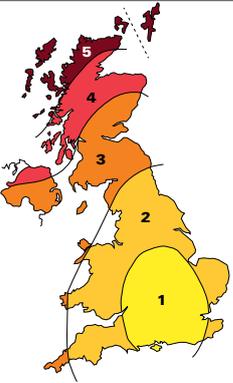
- 1 600 N/m² when a well-sealed ceiling is present;
- 1 900 N/m² when no ceiling or no well-sealed ceiling is present;
- 2 350 N/m² when no ceiling or no well-sealed ceiling is present and a permanent dominant opening is present on an external face of the building.

Minimum underlay requirements:

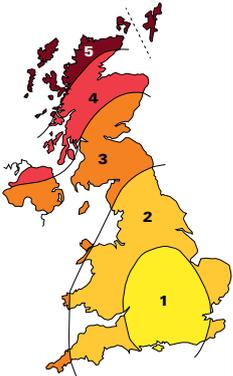
There will undoubtedly be many building projects in the UK where the conditions above do not apply. In these instances additional calculations will need to be undertaken to determine the values that are required. The values conveyed in the document are indeed minimum standards and careful selection of the underlay will be needed to ensure that the recorded wind resistance values are suitable for the job. Ideally the underlay would be capable of tolerating all the conditions that would be encountered in all 5 wind zones.

The Tyvek® solution

As required under BS5534: 2014 underlay manufacturers are required to provide a Zonal Classification label to clearly indicate the suitability of their product in accordance with the standard. The following classification labels are applicable to the Tyvek underlays currently available:

ZONE CLASSIFICATION				
PRODUCT	IDENTIFICATION		MANUFACTURER	WEBSITE
Tyvek® Supro	2507B		DuPont	www.tyvek.co.uk
BATTEN GAUGE	DECLARED WIND UPLIFT RESISTANCE (Pa)		ZONE SUITABILITY	WIND ZONE MAP
	Battened lap	Taped lap*		
≤ 345 mm	1643Pa	3371Pa	1 to 5	
≤ 250 mm	>3272Pa	>3371Pa	1 to 5	
≤ 100 mm	>3272Pa	>3371Pa	1 to 5	

Note: * Lap sealed using adhesive tape (Tyvek® Tape 2060B)

ZONE CLASSIFICATION				
PRODUCT	IDENTIFICATION		MANUFACTURER	WEBSITE
Tyvek® Supro Plus	2507B		DuPont	www.tyvek.co.uk
BATTEN GAUGE	DECLARED WIND UPLIFT RESISTANCE (Pa)		ZONE SUITABILITY	WIND ZONE MAP
	Battened lap	Taped lap*		
≤ 345 mm	1750Pa	3204Pa	1 to 5	
≤ 250 mm	>1750Pa	>3204Pa	1 to 5	
≤ 100 mm	>1750Pa	>3204Pa	1 to 5	

Note: * Lap sealed using integral adhesive tape

Zone Suitability:

The wind uplift resistance figures for the Tyvek® underlay stated above apply to applications where a well-sealed ceiling is present, ridge height is not greater than 15 m, roof pitch is between 12.5° and 75°, site altitude is not greater than 100 m, and no significant site topography is present.

Projects outside of these parameters may require a greater wind uplift resistance.

If in doubt please contact DuPont™ Tyvek® 01275 337660 - option 2.

Tyvek® - unrestricted use:

A Tyvek® underlay with a taped lap will satisfy all geographical locations, all site conditions and all building characteristics.

ZONE CLASSIFICATION				
PRODUCT	IDENTIFICATION		MANUFACTURER	WEBSITE
Tyvek® Enercor® Roof	2537M		DuPont	www.tyvek.co.uk
BATTEN GAUGE	DECLARED WIND UPLIFT RESISTANCE (Pa)		ZONE SUITABILITY	WIND ZONE MAP
	Battened lap	Taped lap*		
≤ 345 mm	2102Pa	3734Pa	1 to 5	
≤ 250 mm	>2102Pa	>3734Pa	1 to 5	
≤ 100 mm	>2102Pa	>3734Pa	1 to 5	

Note: * Lap sealed using adhesive tape (Tyvek® Tape 2060B)



Tyvek® Supro / Tyvek® Supro Plus / Tyvek® Enercor® Roof / Tyvek® Tape 2060B

the
Original
proven since 1990

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