



NSAI
Agrément

(47) Ln6

CI/SfB

**IRISH AGRÉMENT BOARD
CERTIFICATE No. 19/0407**

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TEGRAL VENTEX Breathable Roofing Underlays

NSAI Agrément (Irish Agrément Board) is designated by Government to issue European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are 'proper materials' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.

PRODUCT DESCRIPTION:

This Certificate relates to the following products:

- TEGRAL VENTEX DUO STR 160 EXTRA
- TEGRAL VENTEX UNO 120 CLASSIC

These breathable roof tile underlays are for use on tiled or slated pitched roofs. The products are three-layered membranes with outer layers of nonwoven polypropylene thermally bonded to a central breathable polypropylene film. The underlays are available in a variety of colours.

The underlays are also available with an integral adhesive tape, which facilitates the formation of sealed laps when the underlay is installed on a roof (see Tables 5a and 5b for wind uplift resistance test results and suitability for use in Irish conditions).

USE:

TEGRAL VENTEX Breathable Roofing Underlays are manufactured for use under slates or tiles on open rafter (unsupported) or fully supported pitched roofs. The underlays may be used in the following roof systems:

1. Cold ventilated pitched roof systems.
2. Warm non-ventilated pitched roof systems.
3. Cold non-ventilated pitched roof systems.

The installation of these roof systems using TEGRAL VENTEX Breathable Roofing Underlays is described in Section 2.4 of this Certificate.

TEGRAL VENTEX Breathable Roofing Underlays provide a barrier which:

- Prevents the ingress of wind-blown rain, dust and snow.
- Minimises the wind load generated under wind gusts acting on slates and tiles when installed in accordance with this Certificate.
- Offers superior resistance to tearing during installation.
- Remains flexible at low ambient temperatures.
- Facilitates the control of harmful surface and interstitial condensation in the roof by allowing the safe dispersal of water vapour, when installed in accordance with this Certificate.
- Reduces heat loss caused by air movement through the attic space once installed with no ventilation.

MANUFACTURE AND MARKETING:

The products are marketed by, and manufactured on behalf of:

Tegral Building Products Ltd,
Kilkenny Road,
Athy,
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1.1 ASSESSMENT

In the opinion of the NSAI Agrément, TEGRAL VENTEX Breathable Roofing Underlays, if used in accordance with this Certificate can meet the requirements of the Building Regulations 1997 to 2017, as indicated in Section 1.2 of this NSAI Agrément Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017 REQUIREMENT:

Part D – Materials and Workmanship

D3 – The TEGRAL VENTEX Breathable Roofing Underlays as certified in this Certificate, comprise of ‘proper materials’ fit for their intended use (see Part 4 of this Certificate).

D1 – The TEGRAL VENTEX Breathable Roofing Underlays as certified in this Certificate, meet the requirements of the building regulations for workmanship.

Part A - Structure

A1 – Loading

Tests indicate that a roof incorporating the TEGRAL VENTEX Breathable Roofing Underlays meets the requirements provided the installation complies with the conditions set out in Section 2.4 and Part 3 of this Certificate.

Part B – Fire Safety

Part B Vol 2 – Fire Safety

B4 & B9 – External Fire Spread

The TEGRAL VENTEX Breathable Roofing Underlays will not prejudice the external fire resistance of the roof, as indicated in Section 4.1 of this Certificate.

Part C – Site Preparation and Resistance to Moisture

C4 – Resistance to Weather and Ground Moisture

The TEGRAL VENTEX Breathable Roofing Underlays meet the requirements when installed as indicated in Section 2.4 of this Certificate.

Part F – Ventilation

F2 – Condensation in Roofs

The TEGRAL VENTEX Breathable Roofing Underlays will provide water vapour permeability significantly in excess of that quoted as a minimum for conventional roof tile underlays in BS 5534:2014+A1:2015 *Code of Practice for Slating and Tiling*, and hence, movement of moisture vapour will take place through the underlay.

Where the selected TEGRAL VENTEX Breathable Roofing Underlay is installed with ventilation, the design guidelines contained in Section 2 of the TGD to Part F of the Building Regulations 1997 to 2017 and BS 5250:2011+A1:2016 *Code of Practice for Control of Condensation in Buildings, Annex H Application of design principles – Roofs*, must be met when installing this product.

In a non-ventilated roof system where the selected TEGRAL VENTEX Breathable Roofing Underlay is installed in accordance with this Certificate, the underlay can prevent excessive condensation in a roof or in a roof void above an insulated ceiling as is required by Part F of the Building Regulations 1997 to 2017.

The TEGRAL VENTEX Breathable Roofing Underlay can be treated as a vapour permeable underlay when considering the ventilation requirements of the roof.

Part L – Conservation of Fuel and Energy

L1 – Conservation of Fuel and Energy

Based on the measured vapour resistance of the TEGRAL VENTEX Breathable Roofing Underlays, roofs incorporating insulation can meet the requirements of Part L of the Building Regulations 1997 to 2017.

Where the selected TEGRAL VENTEX Breathable Roofing Underlay is installed with ventilation and the ceiling has to be fixed to the soffit of the rafters as in dormer roof construction, a continuous ventilation space of at least 50mm should be arranged as shown in Diagram 11 of TGD to Part F of the Building Regulations 1997 to 2017: in these circumstances it will be necessary to install a vapour control layer on the warm side of the insulation.

2.1 PRODUCT DESCRIPTION

TEGRAL VENTEX Breathable Roofing Underlays are watertight, vapour permeable, flexible membranes intended for use as underlays beneath slates or tiles on unsupported or supported pitched roofs, constructed in accordance with SR 82:2017 *Slating and tiling – Code of practice*. The underlays are also available with an integral adhesive tape to ensure an effective seal is achieved at overlaps and penetrations.

2.2 MANUFACTURE

TEGRAL VENTEX Breathable Roofing Underlays are manufactured from two UV stabilized spunbonded nonwoven polypropylene layers thermally bonded to a breathable polypropylene central film. The name of the product is printed on the membrane upper face before being rolled on a spindle, cut to length, wrapped and labelled.

The nominal characteristics of the underlays are given in Table 1 below.

	VENTEX UNO 120 CLASSIC	VENTEX DUO STR 160
Colour	Grey	Grey
Roll Width*	1.5m	1.5m
Roll Length*	50m	50m
Roll Weight	9kg	12kg
Mass per unit area*	120g/m ²	160g/m ²
Thickness	0.40mm	0.60mm

Table 1: Product Characteristics

2.2.1 Quality Control

Quality control checks are carried out during production and on the finished product. These checks include visual inspection and checks on roll and membrane weights, dimensions, tensile strength, elongation, tear resistance, and water penetration resistance (hydrostatic head) etc.

2.3 DELIVERY, STORAGE AND MARKING

The TEGRAL VENTEX underlays are supplied in various roll length, wrapped in polyethylene film with a label bearing the company name, product name, grade identification, dimensions, NSAI Agrément Logo and Certificate number as well as basic fitting instructions.

Rolls can be stored horizontally on a clean flat level surface and must be kept under cover to protect from long-term exposure to UV light. Care must be taken to avoid contact with solvents and with materials containing volatile organic components such as coal tar and timbers with newly treated creosote. Reasonable precautions must be taken in

handling the rolls to prevent damage, such as tears or perforations, occurring before and during installation, and prior to the application of the roof covering.

The rolls must not be exposed to a naked flame or other ignition sources.

2.4 INSTALLATION

2.4.1 General

The TEGRAL VENTEX Breathable Roofing Underlays must be installed and fixed in accordance with this Certificate, the Certificate holder's instructions, (a copy of which should accompany each roll), the recommendations of SR 82:2017 and BS 5534:2014+A1:2015.

2.4.2 Installation Procedure

Installation of the TEGRAL VENTEX underlays can be carried out in all conditions normal to pitched roofing work. In roof construction it is important to remember that the underlay is the second line of defence in excluding water penetrating the roof. For this reason the following list of criteria must be met to comply with the requirements of this Certificate.

- At the eaves, the use of an Eaves Carrier i.e. type 5U felt, to meet specifications of IS EN 13707:2013 *Flexible sheets for waterproofing – Reinforced bitumen sheets for waterproofing – Definitions and characteristics* be used. This felt should be laid typically with an overlap in accordance with Table 2 and dressed 50mm into the gutter. In an open eaves construction, the use of eaves guards is recommended. The provision of a tilting fillet / continuous ply support or proprietary eaves ventilation tray is also required to avoid water being trapped behind the fascia board.
- Installation commences by unrolling the underlay horizontally across the rafters, starting at the eaves and working towards the ridges of the roof. The upper (as installed) surface is marked with the product name, and the unmarked surface (coloured white) should face the rafters on unrolling.
- When used unsupported, each horizontal run must be installed with a minimum drape of 10mm to 15mm between rafters at 600mm centres to permit free drainage of water into the gutter.
- When tacking roof underlay to the rafters it is recommended that a 3mm diameter x 20mm long extra-large head clout/felt nails of copper,

aluminium alloy or galvanised steel be used. The underlay should be tacked at the head of the sheet only, at centres not exceeding 1200mm. It is important that all tacking nails be covered by the overlap of the next underlay course.

- Overlaps of the underlay should be provided in accordance with the minimum dimensions given in Table 2, which are taken from SR 82:2017.

Roof Pitch	Min horizontal lap		Vertical lap
	Partially Supported	Fully Supported	
≥35°	100 mm	75 mm	100 mm
15° to 34°	150 mm	100 mm	100 mm
12.5° to 14°	225 mm	150 mm	100 mm

Table 2: Minimum Overlaps

- Where underlay overlaps do not coincide with a batten, consideration should be given to either including an extra batten at the overlap or increasing the underlay overlap to coincide with the next batten.
- Batten gauges should not exceed that recommended by the tile/slate manufacturer for the particular tile/slate being used. Moisture content of battens at time of fixing should not exceed 22%.
- Where timbers on roofs are to be treated with wood preservative, it is essential that manufacturer's guidance be sought in relation to possible chemical attack on the roofing underlay.
- The TEGRAL VENTEX underlays have adequate resistance to tearing but is not designed to withstand the weight of operatives or tiles being loaded out. Battens must therefore be installed as work progresses from eaves to ridge for achieving purchase for feet and avoiding damage to the underlay surface. No materials or implements should be rested on the underlay. Where pressure on the underlay over a rafter is unavoidable, it should be noted that although the membrane has a high coefficient of friction when dry, it does not offer substantial grip, particularly at overlaps or when wet.
- Where the underlay has become damaged for whatever reason, overlaying the damaged area with an additional layer of material ensuring a 150mm overlaps all around the damaged section. Ensuring that the up-slope side is overlapped by the next higher horizontal run of underlay, and secured under a batten.
- Standard methods of workmanship should be used to apply the TEGRAL VENTEX underlays at

penetrations and abutments. It must be ensured that the underlay is turned up at least 50mm at all abutments to be overlapped by the flashings, and that it overlaps the lining tray by at least 100mm at the back face of any abutment.

- Penetrations by soil and vent pipes etc. must be dealt with as follows. The underlay must be star-cut carefully to prevent tears, closely fitted over the pipe, ensuring that all the tabs project upwards along the pipe, and then the tabs taped around the circumference using jointing tape. A proprietary collar must be fitted over the pipe to protect the tape.
- Courses of underlay over a hip should be overlapped by at least 150mm. Each course should overlap the underlay course(s) on the adjacent elevation of the roof.
- Where hips and valleys occur on roofs, lay an additional strip of underlay at least 600mm wide, running continually from eaves to hip. In valleys, the 600mm wide strip of membrane must be laid over the gutter bed, but under the main roof underlay, and held down by valley battens when used. The main roof underlay must be dressed over the valley battens in this case.
- For duo pitch roofs not requiring ridge ventilation, underlay from each side of the ridge should overlap the other side by at least 225mm. For mono pitch roofs not requiring ridge ventilation, the underlay should extend over the mono ridge and the top fascia board by at least 100mm. Where proprietary ventilating ridge systems are specified, detailing of the underlay should be in accordance with the manufacturer's recommendations.
- When used in a warm roof design, a vapour control check (500 gauge Polythene sheeting, or equivalent) should be installed on the warm side of the insulation. The roof should be counter battened to allow a 50mm unobstructed air path between the membrane and the tiles. See figure 2.
- Reference should be made to BS 5250:2011+A1:2016 for counter batten and ventilation requirements on tiled and slated roofs. Counter battens should be used when the membrane is to be fully supported (e.g. warm roofs or roofs using a sarking board). This will allow any moisture accessing the main system to drain away unhindered.
- In addition to the use of counter battens, when close fitting man-made slates which constitute a impermeable external covering are being used, ventilation should be provided above the

membrane in the form of ridge tile and eaves ventilation. Reference should be made to BS 5250:2011+A1:2016, Section H.4.3. In case of doubt the Certificate holder's advice should be sought.

- Once the selected TEGRAL VENTEX breathable roof underlay is installed, it should be covered by the finished roof covering as soon as practicable, to minimise the effects of long-term exposure to UV light.
- The TEGRAL VENTEX Breathable Roofing Underlays as outlined on this certificate are not suitable for use in flat roof construction.
- When used in a cold roof design, which is not ventilated, and where the insulation is laid on top of the ceiling, it is essential that a vapour control check be used on the warm side of the insulation, and all perforations for pipes, electrical cables etc should be sealed. The vapour check should be turned up around the edge of the insulation and sealed to the walls and soffit to inhibit warm humid air entering the attic. Other appropriate measures include:
 - ventilating the dwelling below for the dispersal and rapid dilution of water vapour, particularly in rooms that may experience high humidity (such as kitchens, utility rooms and bathroom).
 - covering and insulating all water tanks in the loft space and lagging pipe work.
 - sealing penetrations in the ceiling and making loft hatches convection-tight by using a compressible draught seal
 - ensuring that there is continuity of joining with walls (and behind wall linings) at sealing perimeters.
 - Ensuring that masonry wall cavities do not interconnect with roof cavities.



Figure 1: Cold Roof detail with permeable roof covering

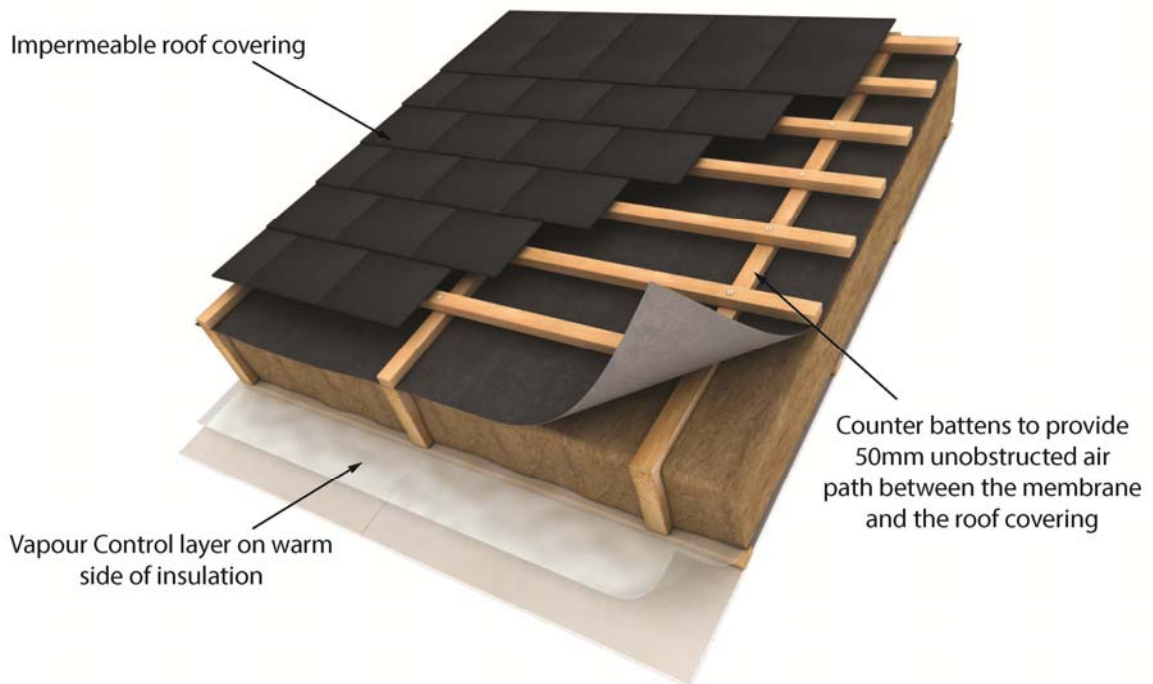


Figure 2: Warm Roof detail with impermeable roof covering

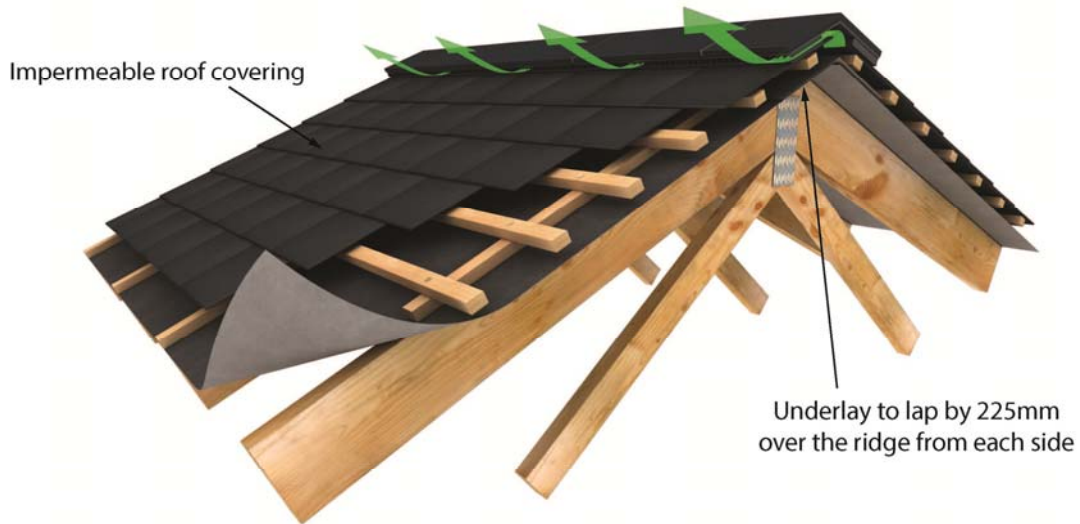


Figure 3: Cold Roof detail with impermeable roof covering - Ridge Detail

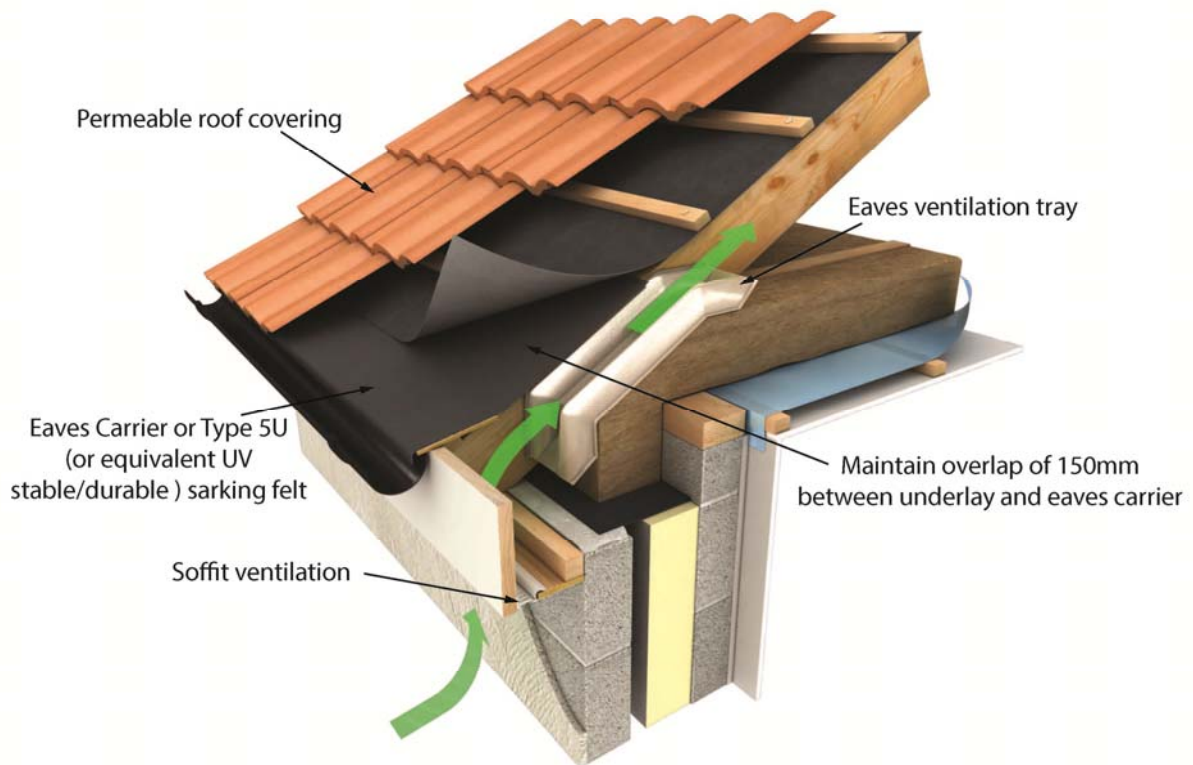


Figure 4: Cold Roof detail with permeable roof covering - Eaves Detail

3.1 GENERAL

The TEGRAL VENTEX Breathable Roofing Underlays provide a satisfactory underlay in slated and tiled pitched roofs, constructed in accordance with SR 82:2017, BS 5250:2011+A1:2016 and BS 8000-6:2013 *Code of practice for slating and tiling of roofs and claddings*.

3.2 STRENGTH

The TEGRAL VENTEX underlays will resist the loads associated with the installation phase of the roof.

3.2.1 Unsupported

The TEGRAL VENTEX underlays are satisfactory for use in unsupported systems as described in Table 5 of this Certificate (see also Figure 4). The classifications shown in Table 5 are based on the simplified approach for obtaining design wind pressure and required uplift resistance as defined in BS 5534:2014+A1:2015 Appendix A Cl. A7. These details are valid where a well-sealed ceiling is present and the roof has a ridge height $\leq 15\text{m}$, a pitch between 12.5° and 75° , and a site altitude $\leq 100\text{m}$ where the topography is not significant.

When building and site conditions are outside these limitations, the design wind pressure p_u should be calculated in accordance with Equation H.13 of BS 5534:2014+A1:2015 in order to determine the required wind uplift resistance. Calculated values can then be compared to the wind uplift resistances in Table 4 of this Certificate in order to select a suitable roof underlay and batten spacing.

Per Equation H.13 of BS 5534:2014, the design wind pressure $p_u = f_u \times q_p$, where:

$f_u = 0.75$ when a well-sealed ceiling is present;

$f_u = 0.90$ when no ceiling or no well-sealed ceiling is present;

$f_u = 1.10$ when no ceiling or no well-sealed ceiling is present on a permanent dominant opening on an external face of the building;

q_p = is the peak velocity pressure from IS EN 1991-1-4:2005 AMD 1:2010 *Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions (including Irish National Annex)*.

See BS 5534:2014+A1:2015 Cl H.6 for all other considerations.

3.2.2 Supported

Tables 5a and 5b show wind uplift resistance test results to BS 5534:2014+A1:2015 and suitability for use in Irish conditions.

The products may be used at any batten gauge in all wind zones when laid over nominally air-tight sheet sarking, for example OSB board, plywood and insulation for warm-roof designs. They can also be used when slates and tiles are nailed directly into the sarking board.

Poorly fitted sarking boards such as square-edged butt-joints are not considered to be airtight and as a result the underlay should be treated as unsupported in those situations.

3.3 WEATHERTIGHTNESS

Tests confirm that TEGRAL VENTEX underlays will resist the passage of water, wind-blown snow and dust into the interior of a building under all conditions to be found in a roof constructed to SR 82:2017, BS 5534:2014+A1:2015, and BS 8000-6:2013.

The TEGRAL VENTEX Breathable Roofing Underlays have been classified as having a resistance to water penetration of Class W1 in accordance with IS EN 13859-1:2014 *Flexible sheets for waterproofing – Definitions and characteristics – Part 1: Underlays for discontinuous roofing*. A Class W1 is the highest resistance to water penetration classification described in the standard.

The underlays may be used to provide temporary waterproofing to the structure of the building prior to the installation of slates or tiles. It is however recommended that this period of time be kept to a minimum in accordance with the manufacturer's guidance.

3.4 VENTILATION / CONDENSATION

For design purposes the water vapour transmission (s_d value) is given in Table 3 of this Certificate. When this value for each membrane is divided by the vapour permeability of still air (0.2gm/MNs) this will give the vapour resistance of each membrane. When the value is greater than 0.25MNs/g, an underlay may be regarded as Type HR membrane for roofs designed in accordance with BS 5534:2014+A1:2015 and BS 5250:2011+A1:2016 Annex H.

In pitched roofs where the insulation follows the line of the pitch, ventilation must be provided above the insulation. This ventilation gap can be above or below the underlays. For all roof coverings, a continuous unobstructed 50mm ventilation gap can be provided in the space between the underlay and the insulation, or

alternatively above the underlay and under the roof covering.

Ventilation of the space above the insulation may not be required provided that the roof coverings are air permeable.

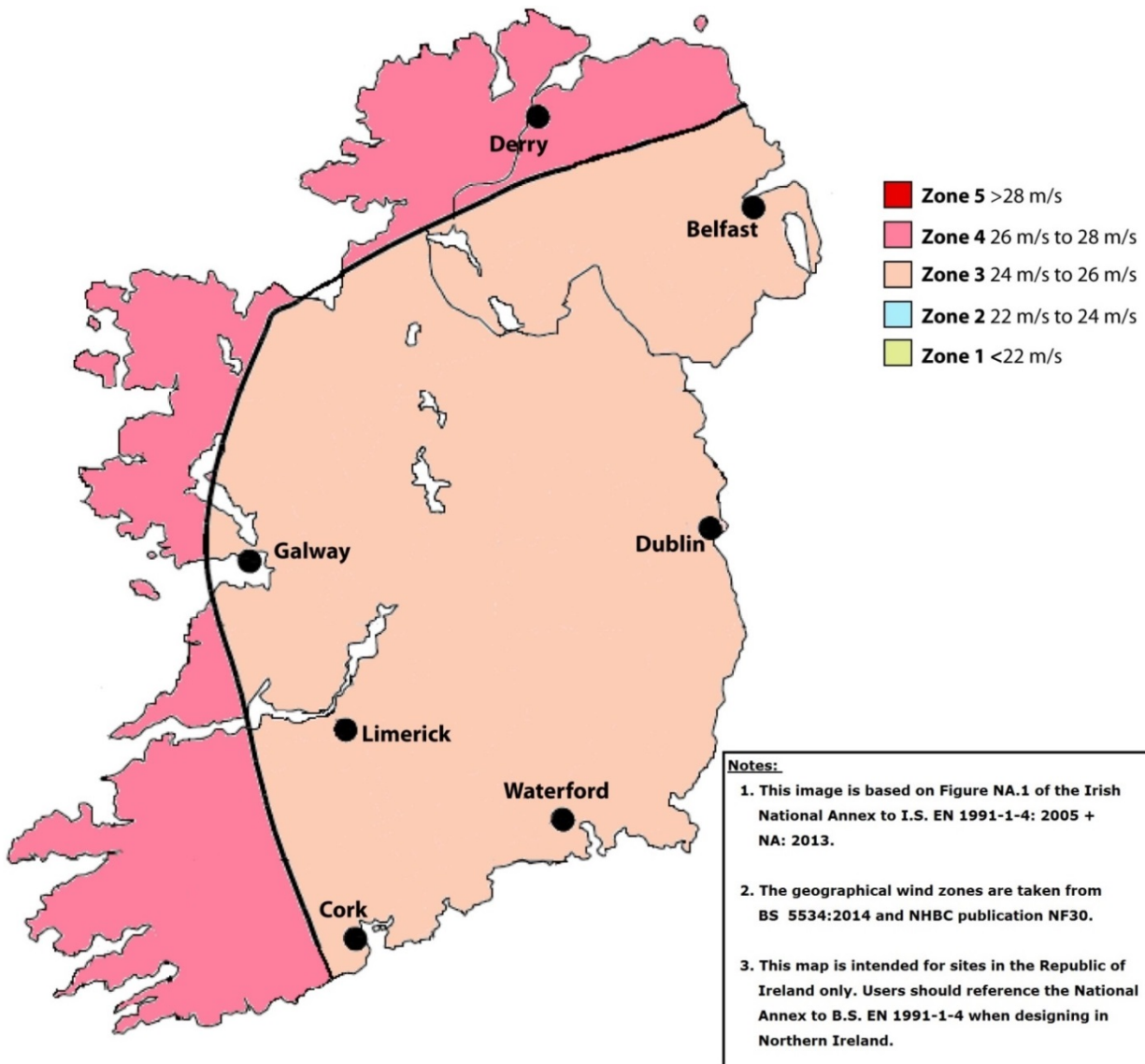
The general principle when designing a roof system that can successfully manage moisture, whether the source of the moisture is from the external environment or if the source arises internally from occupants, bathrooms, cooking etc, is that the most vapour tight layer is located on the inside of the roof structure and all subsequent outer layers become increasingly vapour permeable as we move towards the roof coverings.

In pitched roofs where the insulation follows the line of the ceiling, attic ventilation must be provided in accordance with TGD to Part F of the Building Regulations 1997 to 2017. The optimum size and disposition of vents should be determined by the size and shape of the loft; large and/or complex roofs may require vents at both high and low levels. Further design guidance can be found in BS 5250:2011+A1:2016.

A vapour control layer should be installed on the warm side of the insulation unless a hygrothermal analysis to IS EN ISO 13788:2001 *Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods (Glazer)*, or IS EN 15026:2007 *Hygrothermal performance of building components and building elements – Assessment of moisture transfer by numerical simulation (Wufi)* deems it to be unnecessary.

It is essential that roofs be constructed so as to prevent moisture penetration and the formation of condensation. In accordance with good building construction practice, all openings for services and trap doors should be draught sealed, and trap doors should not be located in bathrooms, shower rooms or kitchens.

The risk of condensation is highest in new-build construction during the first heating period, where there is high moisture loading owing to wet trades such as cast concrete slabs or plaster. Additional ventilation should be provided during this period, including the opening of doors and windows. The risk diminishes as the building dries out naturally.



4.1 BEHAVIOUR IN FIRE

TEGRAL VENTEX Breathable Roofing Underlays have similar properties in relation to fire as those of polythene sheets and so will present no additional fire hazard to a roof structure in which it is incorporated, in comparison with conventional roof tile underlays.

All roof underlay's were tested and classified in accordance with I.S. EN 13501-1:2007, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*, Table 1. Tests indicate that there is a risk of fire spread if accidentally ignited during maintenance works etc (e.g. by a roofer or plumber's torch). As with all types of sarking material, care must be taken during building and maintenance to avoid the material becoming ignited. Class E indicates a product which satisfies that no surface spread of flame exceeds 150mm as required when tested in accordance with I.S. EN ISO 11925-2 and Class F indicates no performance criteria declared.

When the products are used in a fully supported situation, the reaction to fire will be determined by the supporting deck.

The TEGRAL VENTEX underlays, being combustible materials, must be separated from chimneys and flues as indicated in Cl 2.5.6, Cl 3.8.3 and Cl 3.11.1 of TGD to Part J of the Building Regulations 1997 to 2017.

If a fire does occur, the contribution of toxic gas attributed to the membrane is negligible.

4.2 WATER PENETRATION

The TEGRAL VENTEX Breathable Roofing Underlays, when used in accordance with this Certificate, present no significant risk of water penetration.

4.3 DURABILITY AND MAINTENANCE

The TEGRAL VENTEX underlays when installed in accordance with this Certificate, the Certificate Holders instructions and relevant codes of practice, are virtually unaffected by conditions normally found in a roof space and will have a design life comparable with that of traditional roof tile underlays, provided that they are not exposed to sunlight for long periods during the installation phase. The durability of the roof underlay will be dependent on the performance of the roof covering (slates/tiles) and this could be compromised if the roof is not routinely maintained or is subjected to inappropriate traffic.

Such maintenance would involve building owners having their roofs inspected annually, preferably in late autumn. Inspection should include checking for missing, damaged or loose slates/tiles and their accessories or flashings. Clogged gutters or downpipes should be unblocked and cleaned.

4.4 WATER VAPOUR PENETRATION AND CONDENSATION RISK

TEGRAL VENTEX underlays have significantly higher water vapour permeability than that quoted as a minimum for conventional roof tile underlays in BS 5534:2003, and hence movement of moisture vapour can take place through the underlay. The general design guides contained in BS 5250:2011+A1:2016 is met when installing this product. Typical values of water vapour resistance are given in Table 3.

The TEGRAL VENTEX Breathable Roofing Underlays can be treated as vapour permeable underlays when considering the ventilation requirements of the roof.

4.5 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

Table 3 and 4 give a summary of the technical investigations carried out on TEGRAL VENTEX range of underlays.

4.6 OTHER INVESTIGATIONS

(i) Existing data on product properties in relation to, mechanical strength/stability, environmental impact and durability were assessed.

(ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

(iii) Site visits were conducted to assess the practicability of installation and the history of performance in use of the product.

(iv) Driving rain resistance was assessed.

(v) A condensation risk analysis was performed.

4.7 CE MARKING

The manufacturer has taken responsibility of CE marking the TEGRAL VENTEX range of underlays in accordance with harmonised European Standard EN 13859-1:2014 and EN 13859-2:2014. An asterisk (*) appearing in this Certificate indicates that data shown is an essential characteristic of the product and declared in the manufacturers Declaration of Performance (DoP). Reference



should be made to the latest version of the manufacturer's DoP for current information on any essential characteristics declared by the manufacturer.

Table 3: Water Vapour Resistance

Material	Resistance to water penetration*	Resistance to water penetration after artificial ageing*	Water vapour transmission properties (Sd)*	Water Vapour Resistance (MNs/g)	Water Vapour Permeability (g/m ² /day)
Units/Test method	I.S. EN 1928 I.S. EN 13111 [Class]	I.S. EN 13859-1;2 Annex C [Class]	I.S. EN 12572 I.S. EN 1931 [m]	BS 3177	BS 3177
TEGRAL VENTEX UNO 120 CLASSIC	W1	W1	0.02	0.19	1065
TEGRAL VENTEX DUO STR 160 EXTRA	W1	W1	0.02	0.18	1166

Table 4: Physical Properties - Directional

Units/Test method	Tensile strength N/50mm* (I.S. EN 12311-1)		Elongation at break (%)* (I.S. EN 12311-1)		Nail tear resistance (N)* (I.S. EN 12310-1)	
	Unaged		Unaged			
	MD ¹	CD ²	MD	CD	MD	CD
TEGRAL VENTEX UNO 120 CLASSIC	260	180	50	80	120	140
TEGRAL VENTEX DUO STR 160 EXTRA	420	420	40	50	390	360

¹ MD - Machine Direction,
² CD - Cross Machine Direction
[†] Aged - 336 hours UVA at 50°C followed by 90 days at (70±2)°C
[§] Wet Strength - as modified in accordance with EN 13859-1: 2005

Table 5a: Test results for wind uplift resistance to BS 5534:2014+A1:2015			
Product	Wind Uplift Pressure⁽²⁾		
	345mm Batten Gauge Battered Lap	250mm Batten Gauge Battered Lap⁽¹⁾	345mm Batten Gauge With Taped Laps
TEGRAL VENTEX UNO 120 CLASSIC	1172 Pa	2331 Pa	2310 Pa
TEGRAL VENTEX DUO STR 160 EXTRA	1075 Pa	2135 Pa	3146 Pa
<p>^{1.} Underlays with a wind uplift resistance at a 250mm batten gauge that meet the minimum design wind pressure of 820Pa (Zone 1) are deemed to satisfy the requirements for use at 100mm batten gauge in all wind zones (Zones 1 to 5, see Figure 5).</p> <p>^{2.} Mean of test results.</p>			

Table 5b: Test results for wind uplift resistance to BS 5534:2014+A1:2015			
Product	Geographical Wind Zones		
	345mm Batten Gauge Battered Lap	250mm Batten Gauge Battered Lap⁽¹⁾	345mm Batten Gauge With Taped Laps
TEGRAL VENTEX UNO 120 CLASSIC	Zone 3*	Zones 3 and 4*	Zones 3 and 4*
TEGRAL VENTEX DUO STR 160 EXTRA	Not suitable for use in Irish conditions	Zones 3 and 4*	Zones 3 and 4*
<p>1. The above classifications are valid where:</p> <ol style="list-style-type: none"> A well-sealed ceiling is present; The roof has a ridge height $\leq 15\text{m}$; A pitch between 12.5° to 75°; A site altitude $\leq 100\text{m}$; Where topography is not significant. <p>2. When outside the limitations of Note 1 above, the design wind pressure, p_{ur}, should be calculated in accordance with BS 5534:2014+A1:2015 (Equation H.13) in order to determine the required wind uplift resistance. Calculated values can then be compared to wind uplift resistances published above in order to select a suitable roof underlay and batten spacing.</p> <p>* Only zones 3 and 4 exist in Ireland. See Figure 5 for details.</p>			

5.1 National Standards Authority of Ireland ("NSAI") following consultation with NSAI Agrément has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue or revision date so long as:

- (a) the specification of the product is unchanged.
- (b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
- (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
- (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
- (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
- (f) the registration and/or surveillance fees due to IAB are paid.

5.2 The NSAI Agrément mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the NSAI Agrément mark and certification number and must remove them from the products already marked.

5.3 In granting Certification, the NSAI makes no representation as to;

- (a) the absence or presence of patent rights subsisting in the product/process; or
- (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
- (c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.

5.4 This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.

5.5 Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.

5.6 The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.

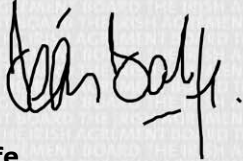
5.7 Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

NSAI Agrément

This Certificate No. **19/0407** is accordingly granted by the NSAI to **Tegral Building Products Ltd** on behalf of NSAI Agrément Board.

Date of Issue: **19th February 2019**

Signed



Seán Balfe
Director of NSAI Agrément

Readers may check that the status of this Certificate has not changed by contacting NSAI Agrément, NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. www.nsai.ie

Bibliography

BS 5534:2014+A1:2015 *Code of Practice for Slating and Tiling.*

BS 5250:2011+A1:2016 *Code of Practice for Control of Condensation in Buildings, Annex H Application of design principles – Roofs.*

SR 82:2017 *Slating and tiling – Code of practice.*

IS EN 13707:2013 *Flexible sheets for waterproofing – Reinforced bitumen sheets for waterproofing – Definitions and characteristics.*

BS 8000-6:2013 *Code of practice for slating and tiling of roofs and claddings.*

IS EN 1991-1-4:2005 AMD 1:2010 *Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions (including Irish National Annex).*

IS EN 13859-1:2014 *Flexible sheets for waterproofing – Definitions and characteristics – Part 1: Underlays for discontinuous roofing.*

IS EN ISO 13788:2001 *Hygrothermal performance of building components and building elements – Internal surface temperature to avoid critical surface humidity and interstitial condensation – Calculation methods (Glazer).*

IS EN 15026:2007 *Hygrothermal performance of building components and building elements – Assessment of moisture transfer by numerical simulation (Wufi).*

I.S. EN 13501-1:2007, *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests.*