

DuPont de Nemours (Luxembourg) S.à r.l

Rue General Patton
L-2984
Luxembourg

Tel: 08444 068 722

e-mail: tyvek.construction@dupont.com

website: www.building.dupont.co.uk



Agrément Certificate

90/2548

Product Sheet 10

TYVEK⁽¹⁾ CONSTRUCTION MEMBRANES

DUPONT AIRGUARD REFLECTIVE E

This Agrément Certificate Product Sheet⁽²⁾ relates to DuPont AirGuard⁽¹⁾ Reflective E, for use as an air barrier and vapour control layer in walls and floors.

(1) TYVEK and AirGuard are registered trademarks of E.I. du Pont de Nemours & Co. or its affiliates.

(2) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Risk of condensation — the product is a vapour control layer and will reduce the risk of interstitial condensation (see section 6).

Air permeability — the product is an air barrier and can reduce heat loss by air infiltration (see section 7).

Thermal insulation — the product can contribute to limiting heat loss through walls and floors (see section 8).

Strength — the product has adequate strength to resist the loads associated with the construction of the wall or floor (see section 9).

Properties in relation to fire — the product is classified as Class E in accordance with EN 13501-1 : 2007 and its use is restricted in some cases by the national Building Regulations (see section 10).

Durability — the product will have a lifetime equal to that of the building element in which it is installed (see section 12).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Third issue: 2 March 2021

Originally certificated on 30 January 2017

Hardy Giesler
Chief Executive Officer

The BBA is a UKAS accredited certification body – Number 113.

*The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk
Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

British Board of Agrément

Bucknalls Lane
Watford
Herts WD25 9BA

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tel: 01923 665300
clientservices@bbacerts.co.uk
www.bbacerts.co.uk

Regulations

In the opinion of the BBA, DuPont AirGuard Reflective E, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	B3(4)	External fire spread
Comment:		The product can contribute to satisfying this Requirement. See section 10.1 of this Certificate.
Requirement:	B4(1)	External fire spread
Comment:		The product is restricted by this Requirement. See section 10 of this Certificate.
Requirement:	C2(c)	Resistance to moisture
Comment:		The product can contribute to limiting the risk of interstitial condensation. See section 6.3 of this Certificate.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		The product can contribute to satisfying this Requirement. See sections 7 and 8 of this Certificate.
Regulation:	7(1)	Materials and workmanship
Comment:		The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	26	CO₂ emission rates for new buildings
Regulation:	26A	Fabric energy efficiency rates for new dwellings (applicable to England only)
Regulation:	26A	Primary energy consumption rates for new buildings (applicable to Wales only)
Regulation:	26B	Fabric performance values for new dwellings (applicable to Wales only)
Comment:		The product can contribute to satisfying these Regulations. See sections 7 and 8 of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The product can contribute to a construction satisfying this Regulation. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	2.4	Cavities
Comment:		The product can contribute to satisfying this Standard with respect to clause 2.4.2 ⁽¹⁾⁽²⁾ . See section 10.1 of this Certificate.
Standard:	3.15	Condensation
Comment:		The product can contribute to limiting the risk of interstitial condensation, with reference to clauses 3.15.1 ⁽¹⁾⁽²⁾ and 3.15.5 ⁽¹⁾⁽²⁾ of this Standard. See section 6.3 of this Certificate.
Standard:	6.1(b)	Carbon dioxide emissions
Standard:	6.2	Building insulation envelope
Comment:		The product can contribute to satisfying the requirements of these Standards, with reference to clauses 6.1.1 ⁽¹⁾ , 6.1.2 ⁽²⁾ , 6.2.4 ⁽¹⁾ , 6.2.6 ⁽²⁾ , 6.2.10 ⁽¹⁾ , 6.2.11 ⁽¹⁾⁽²⁾ , 6.2.12 ⁽²⁾ and 6.2.13 ⁽²⁾ . See sections 7 and 8 of this Certificate.

Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. In addition, the product can contribute to a construction meeting a higher level of sustainability as defined in this Standard, with reference to clauses 7.1.4 ⁽¹⁾ [Aspects 1 ⁽¹⁾ and 2 ⁽¹⁾], 7.1.6 ⁽¹⁾⁽²⁾ [Aspects 1 ⁽¹⁾⁽²⁾ and 2 ⁽¹⁾⁽²⁾], 7.1.7 ⁽¹⁾ [Aspect 1 ⁽¹⁾], 7.1.9 ⁽²⁾ [Aspects 1 ⁽²⁾ and 2 ⁽²⁾] and 7.1.10 ⁽²⁾ [Aspects 1 ⁽²⁾]. See sections 7 and 8 of this Certificate.
Regulation:	12	Building standards applicable to conversions
Comment:		Comments in relation to the product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .
		(1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The product is acceptable. See section 12 and the <i>Installation</i> part of this Certificate.
Regulation:	29	Condensation
Comment:		The product can contribute to limiting the risk of interstitial condensation. See section 6.3 of this Certificate.
Regulation:	35(4)	Internal fire spread - structure
Comment:		The product can contribute to satisfying this Regulation. See section 10.1 of this Certificate.
Regulation:	39(a)(i)	Conservation measures
Regulation:	40(2)	Target carbon dioxide emission rate
Comment:		The product can contribute to satisfying these Regulations. See sections 7 and 8 of this Certificate.

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 1 *Description* (1.3) of this Certificate.

Additional Information

NHBC Standards 2021

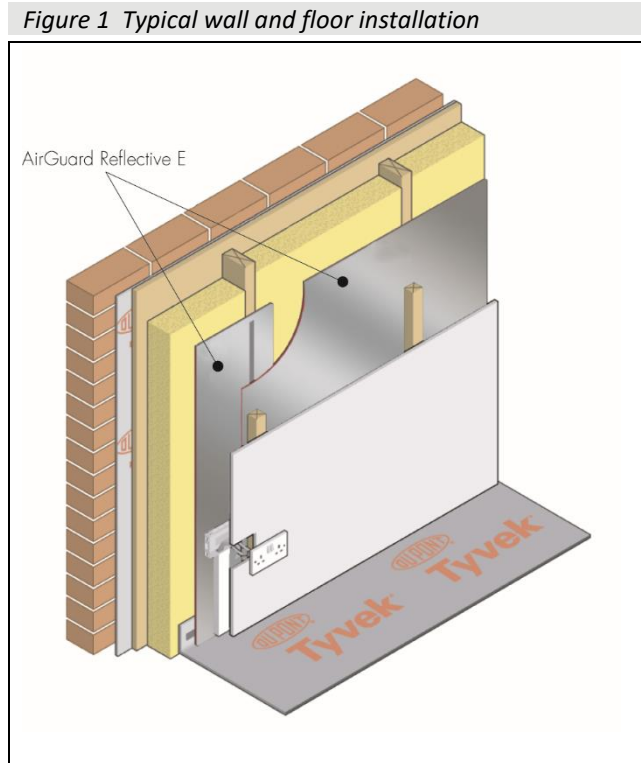
In the opinion of the BBA, DuPont AirGuard Reflective E, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapters 6.2 *External timber framed walls*, 6.9 *Curtain walling and cladding*, 6.10 *Light steel framed walls and floors* and 9.2 *Wall and ceiling finishes*.

CE marking

The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard EN 13984 : 2013.

1 Description

1.1 DuPont AirGuard Reflective is an air barrier and vapour control layer with a low-emissivity aluminium foil face on one side. It is placed on the warm side of the insulation with the foil surface facing the interior of the building. A typical wall and floor installation is shown in Figure 1.



1.2 DuPont AirGuard Reflective E consists of a spunbond polypropylene, laminated with an aluminium foil.

1.3 The product has the nominal characteristics of:

Thickness (mm)	0.31
Mass per unit area ($\text{g}\cdot\text{m}^{-2}$)	122
Roll length (m)	50
Roll width (m)	1.5
Equivalent air layer thickness — s_d (m)	
minimum	1500
nominal	2400
Water vapour resistance ($\text{MN}\cdot\text{s}\cdot\text{g}^{-1}$)	
minimum	7500
nominal	12000
Watertightness	pass
Tensile strength (N per 50 mm)	
longitudinal	180
transverse	160
Elongation at maximum tensile force (%)	
longitudinal	15
transverse	25
Nail tear (N)	
longitudinal	250
transverse	280
Reaction to fire	Class E.

1.4 The following products are used in conjunction with DuPont AirGuard Reflective E to minimise air infiltration:

- TYVEK Metallised Tape — to close laps between the membrane and for making good where cuts are made
- TYVEK Acrylic Tape (double-sided) — an acrylic tape for sealing overlaps and bonding membrane to smooth surfaces
- TYVEK Butyl Tape (double-sided) — for sealing penetrations, eg behind metal brackets and timber battens (under compression).

2 Manufacture

2.1 The product is manufactured by bonding a spunbond polypropylene to an aluminium foil by using a co-extrusion lamination process.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

3 Delivery and site handling

3.1 Rolls are delivered to site packaged. Each package carries a label bearing the BBA logo incorporating the number of this Certificate.

3.2 The rolls should be stored flat on their sides, on a smooth, clean, dry surface, under cover and protected from sunlight.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on DuPont AirGuard Reflective E.

Design Considerations

4 Use

4.1 DuPont AirGuard Reflective E is satisfactory for use as an air barrier and vapour control layer in conventional timber-frame, masonry and steel-frame walls and floor structures. The product may be used as part of a system with TYVEK e-Guard W1 (see Figure 1 and Product Sheet 11 of this Certificate).

4.2 Where constructions need to comply with *NHBC Standards 2021*, specifiers should observe the requirements of this document.

4.3 It is essential that proper care and attention is given to maintaining the product's integrity and continuity.

4.4 The product is effective in reducing the U value (thermal transmittance) of walls and floors in which it is installed (see section 8). Further information is given in BRE Report BR 262 : 2002.

4.5 Walls in new buildings should be designed and constructed in accordance with the relevant recommendations of the UK National Annexes of BS EN 1996-1-1 : 2005 and BS EN 1996-2 : 2006.

4.6 Suspended concrete and suspended timber ground floors incorporating the product must include suitable ventilation.

5 Practicability of installation

The product can be readily installed by operatives experienced with this type of product.

6 Risk of condensation

6.1 The risk of condensation occurring will depend upon the properties and vapour resistance of other materials used in the construction, the internal and external conditions, and the effectiveness of the product's installation.

6.2 Consideration must be given in the overall installation to minimising penetrations by services. Joints at ceilings/walls and wall/floor junctions must be sealed to offer significant resistance to water vapour transmission. Sealing should also be carried out in accordance with the Certificate holder's instructions.



6.3 Constructions should be in accordance with the nominal recommendations of BS 5250 : 2011, Annexes F and G, and favourably assessed in accordance with Annex D, using a minimum air layer equivalent value (s_d) of not less than 1500 m (equivalent to a water vapour resistance of $7500 \text{ MN}\cdot\text{s}\cdot\text{g}^{-1}$) for the product.

7 Air permeability



When lapped, fixed and taped correctly, the product acts as an air barrier and can contribute to elements and junctions minimising heat loss by unplanned air infiltration and exfiltration. Guidance in this respect can be found in the documents supporting the national Building Regulations.

8 Thermal insulation



Calculations of thermal transmittance (U value) should be carried out in accordance with BS EN ISO 6946 : 2017 and BRE Report BR 443 : 2006, using an emissivity value of 0.05 for the foil surface of the product. Where this faces into an unventilated cavity this corresponds to the following cavity thermal resistance values:

- walls
 - a cavity > 20 mm thick, $0.67 \text{ m}^2\cdot\text{K}\cdot\text{W}^{-1}$
- floors
 - a cavity > 17 mm thick, $0.58 \text{ m}^2\cdot\text{K}\cdot\text{W}^{-1}$
 - a cavity > 25 mm thick, $0.80 \text{ m}^2\cdot\text{K}\cdot\text{W}^{-1}$.

9 Strength

The product will resist the normal loads associated with installation of the wall or floor.

10 Properties in relation to fire



10.1 The product is classified as Class E in accordance with EN 13501-1 : 2007⁽¹⁾. Where the product forms the face of a cavity the spacing of cavity barriers are restricted by the national Building Regulations.

(1) Classification report PR-16-0057 issued by FIRES s.r.o. A copy of the report is available from the Certificate holder.



10.2 In England and Wales the product should not be used on buildings that have a storey at least 18 m above ground level and contain: one or more dwellings, an institution, a room for residential purposes (excluding any room in a hostel, hotel or boarding house), student accommodation, care homes, sheltered housing, hospitals or dormitories in boarding schools.

11 Maintenance

As the product is confined within a wall or floor structure and has suitable durability (see section 12), maintenance is not required. Any damaged areas should be repaired or replaced before completion in accordance with section 15.

12 Durability



The product will have a lifetime equal to that of the building element in which it is installed.

Installation

13 General

Installation of DuPont AirGuard Reflective E should be in accordance with Certificate holder's instructions and good building practice.

14 Procedure

Walls

14.1 The product is positioned on the warm side of the thermal insulation and held in place by staples at approximately 500 mm centres to the background structure. Joints between adjacent sheets of the material should be lapped 100 mm over a support and be sealed with a strip of either TYVEK Acrylic Tape (double-sided) or TYVEK Metallised Tape (single-sided).

14.2 At all penetrations and abutments the product is cut neatly to fit as closely as possible and the joint sealed with a strip of TYVEK Acrylic Tape (double-sided) and TYVEK Metallised Tape (single-sided). Penetrations must be kept to a minimum.

14.3 The product is made vapour- and convection-tight at all window and door openings and at other detailing. The membrane is sealed tight against the frame with Tyvek Butyl Tape (double-sided) and compressed with a timber batten fixed over. All membrane laps and penetrations should be sealed with Tyvek Metallised Tape (single-sided).

14.4 Internal lining must be set on spacer battens, leaving a minimum gap of 25 mm behind the lining to accommodate wiring and other services and reduce the need for penetrations of the vapour control layer/air barrier. When used without a void, the product does not contribute to the thermal value of the construction but continues to act as a vapour control layer/air barrier.

Floors

14.5 The product is either installed above or beneath the floor boarding and beneath the internal floor finishes.

14.6 Joints between adjacent sheets of the material should be lapped 100 mm and be sealed with a strip of either TYVEK Butyl Tape (double-sided) or TYVEK Metallised Tape (single-sided).

15 Repair

Damage to DuPont AirGuard Reflective E can be repaired with TYVEK Metallised Tape. Extensive damaged areas must be made good by overlaying the damaged area with a new sheet, sealed in place with either TYVEK Metallised Tape (single-sided) or TYVEK Acrylic Tape (double-sided).

16 Tests

16.1 An assessment was made of data in relation to:

- tensile strength and elongation
- resistance to nail tear
- watertightness
- water vapour transmission properties
- effect of heat ageing on water vapour transmission properties
- reaction to fire.

16.2 Tests were carried out to determine:

- mass per unit area
- tensile strength
- elongation
- emissivity
- emissivity after heat ageing for 90 days at 70°C
- emissivity after combined heat and humidity ageing for 90 days at 70°C and 500 hours at 90% relative humidity at 45°C
- air permeability, including taped joint.

16.3 Data from a previous assessment was used to assess the tensile shear strength of a joint.

17 Investigations

17.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

17.2 The risk of interstitial condensation in a range of typical constructions was evaluated.

17.3 An evaluation was made of the thermal performance of the product in typical constructions.

Bibliography

BRE Report BR 262 : 2002 *Thermal insulation : avoiding the risks*

BRE Report BR 443 : 2006 *Conventions for U-value calculations*

BS 5250 : 2011 + A1 : 2016 *Code of practice for control of condensation in buildings*

NA to BS EN 1996-1-1 : 2005 + A1 : 2012 UK National Annex to *Eurocode 6 — Design of masonry structures — General rules for reinforced and unreinforced masonry structures*

NA to BS EN 1996-2 : 2006 UK National Annex to *Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

BS EN ISO 6946 : 2017 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

EN 13501-1 : 2007 + A1 : 2009 *Fire classification of construction products and building elements — Classification using test data from reaction to fire tests*

EN 13984 : 2013 *Flexible sheets for waterproofing — Plastic and rubber vapour control layers — Definitions and characteristics*

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

18.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

18.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.