September 2024 2nd Edition

DUPONT Tyvek®

Technical Manual – Metal Frame Walls and Fire Performance

DuPont™ Tyvek® & AirGuard® Systems

Membranes, tapes and technical support













High-Rise, Multi-occupancy Commercial, Residential, Health, Education...

- Ventilated Facade Systems
  - Breather Membrane placement
  - AVCL placement
  - Penetrations & Brackets
  - Fire Stops & Barriers
  - Window Details
  - Separating (Party) Walls

Useful step by step installation guides and videos are available from the DuPont™ Tyvek® Building Knowledge Centre and our websites:

www.building.dupont.co.uk

www.energy-efficiency.dupont.com

Important: All building regulations should be checked to ensure compliance, especially with respect to fire performance

Ventilated Façade Systems

Masonry and Steel Frame Construction



The evolution that has occurred over the last 30 years with external wall systems has been significant. They have become more technical in terms of thermal performance, moisture management, airtightness and fire protection.

Traditionally, masonry and steel construction was limited to agricultural buildings and warehouses and this general perception still exists today. However, they are now commonly employed in a wide range of developments, including offices, factories, schools, public buildings and high-rise residential dwellings.

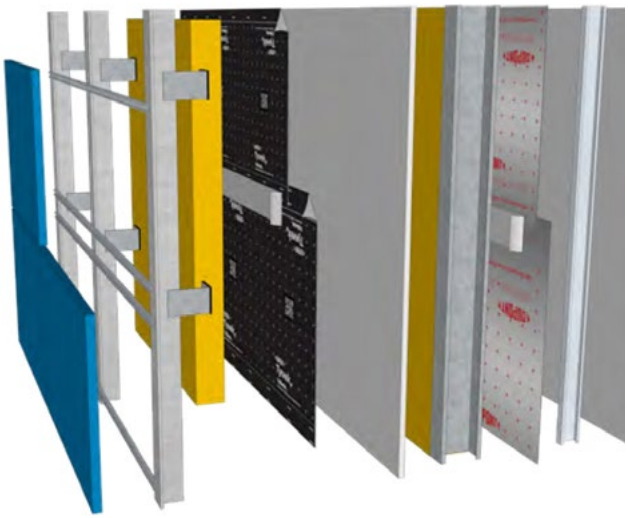
In medium to high-rise developments, masonry or steel structural elements are often preferred, and these commonly include infill wall panels composed of lightweight galvanized steel framing.

The strength and durability of these components makes them resistant against extreme wind conditions and moisture. Thermal insulation, sheathings and internal linings however, must still be protected and therefore the functions provided by DuPont™ Tyvek® and AirGuard® membranes continue to be essential.

SFS – Rainscreen Wall System

External Membrane Cold Side
The illustration opposite shows a typical Rainscreen System with a Tyvek® Trifecta® breather membrane (alt: **Tyvek® FireCurb®**) fixed directly over the sheathing. The insulation fitted between cladding brackets would need to be suitably moisture resistant.

Internal Membrane Warm Side
The AVCL is normally installed behind the dry-lining, spaced off by a services void (channels). Recommended AVCL for SFS systems is AirGuard® A2 FR.

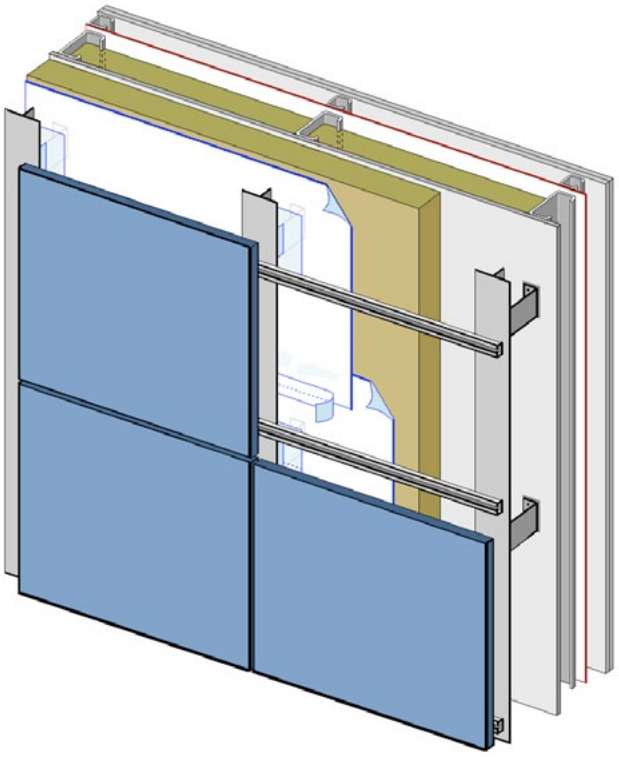


Detailing Commercial wall systems – Tyvek® & AirGuard® membranes

Membrane on the insulation

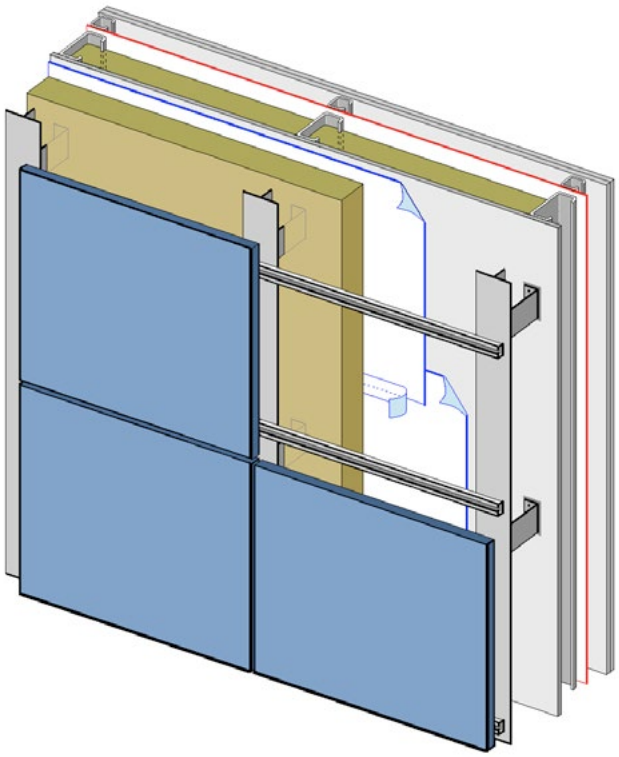
The traditional position for a breather membrane in an external wall system is on the outside (cold) face of the insulation. The water resistance of Tyvek® membranes far exceeds the EN13859-2 W1 class, so they provide exceptional weather protection to the wall, both during construction and in the long term.

Applying the membrane to the outside face of the insulation can be difficult, as it will have to be cut and formed around the many brackets that are fixed back to the sheathing and extend through to support the external cladding. These penetrations will have to be made weathertight by sealing with the appropriate single-sided tape (see illustration opposite).



Membrane behind the insulation

Rainscreen systems often incorporate an insulation product that is resilient to moisture, allowing the membrane to be installed behind it, directly onto the sheathing board. A noteworthy benefit here is that the membrane can be installed easily and very quickly, allowing the wall system to be protected from the weather at the earliest possible opportunity. This method avoids the time-consuming process of cutting and taping around the brackets (described above). Designers and installers should check that this arrangement is accepted by all parties involved.



Moisture Resistant Sheathing

Using a Tyvek® breather membrane in a rainscreen system will ensure continuous weather protection is provided to the sheathing, insulation, structure and the building interior. Some sheathing products are purported to have a weather resistance function, to the extent that a VPM is not needed.

Specifiers are advised to check that such claims are supported with third party documentation which demonstrate suitability. Emphasis should be on compliance with the relevant technical standards and regulations that specifically address **RESISTANCE TO EXTERNAL MOISTURE.** Where such products do not state compliance, or where doubt exists, a Tyvek® breather membrane should be used. In any case the joints of sheathing products must be protected against water ingress.

Floor junctions

The membrane at the base of upper storey panels should be extended sufficiently to cover the intermediate floor zone and provide a 100mm lap over the lower panel. Lap sections on pre-fabricated panels should be temporarily fixed back for transport.

Cavity trays

The Tyvek® membrane should lap over cavity trays. Cutting the membrane and sliding the cavity tray behind will be sufficient. Alternatively a separate skirting strip may be used to ensure an adequate lap detail.

External corner

Returns around external corners should be at least 300mm.

Damage repair

Any damage that occurs in a Tyvek® membrane should be made good as soon as possible:

Minor damage may be repaired with Tyvek® Acrylic Tape (single sided) or AirGuard® A2 FR system tape.

More extensive damage should be covered with a Tyvek® patch Large areas of damaged Tyvek® should be replaced completely.

The standard method of application for a Tyvek® breather membrane is for it to be unrolled horizontally over the face of the sheathing/framing, but it may also be laid vertically if this is more appropriate.

Laps

The upper run of Tyvek® membrane must overlap the lower to prevent water which may run down the wall from running behind the membrane. All horizontal laps should be at least 100mm and vertical laps 150mm.

Fixings

Tyvek® membranes are normally fixed to the sheathing with stainless steel staples or appropriate screws. Fixings should be as follows:

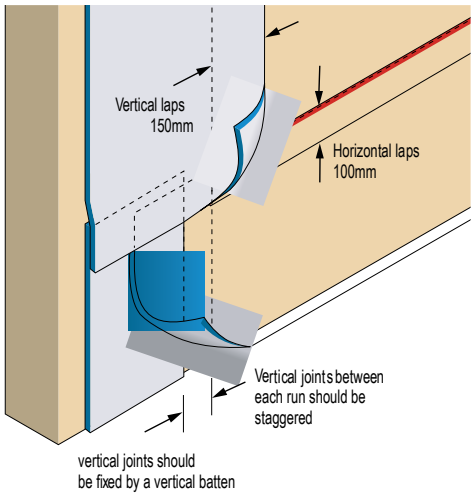
Horizontal fixing

Generally 600mm or at stud positions,

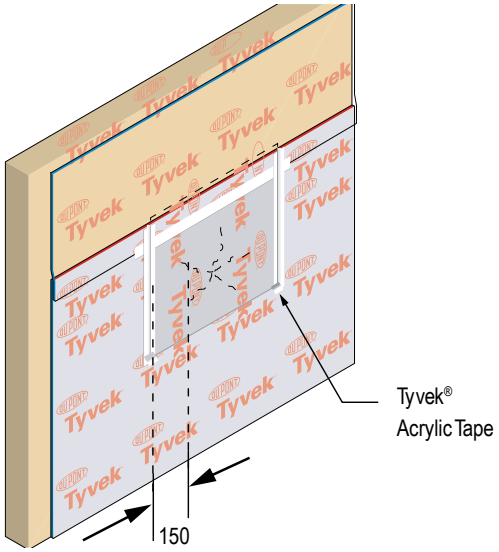
Vertical fixing

at stud positions	300 mm
at sides of openings	150 mm
at vertical membrane joints	150 mm
at end of panels*	150 mm

* required when membrane is fixed to panels in the factory.







Detailing Commercial wall systems – Tyvek® & AirGuard® membranes

Internal AVCL Fixing

DuPont™ AirGuard® Reflective and AirGuard® A2 FR are the most suitable membranes for internal application in SFS systems. Both membranes have high vapour resistance, are 100% airtight and have low emissivity (reflective) surfaces.

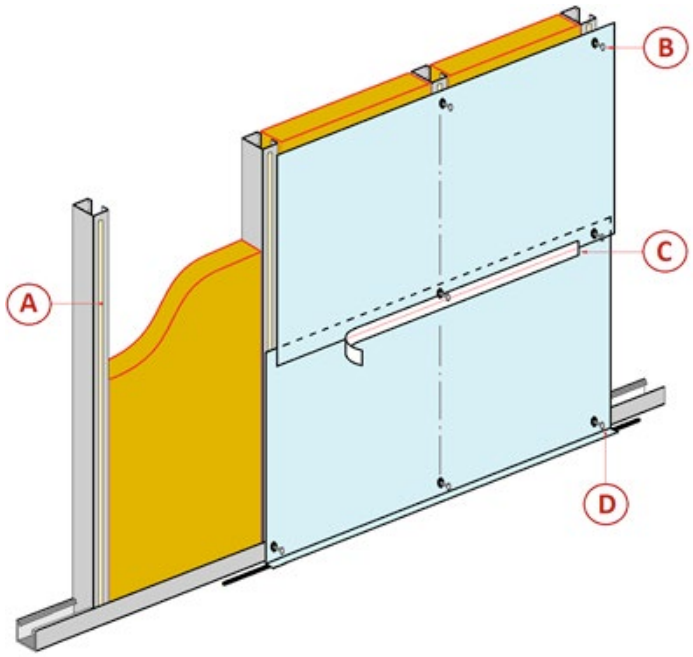
Key to SFS AVCL diagram

A. Continuous strip of Tyvek® Double sided Tape applied to studs. MIN. every 550 mm centres for AirGuard® A2 AVCL, as detailing is part of the fire certificate.

B. Drill-tip (self-tapping) screw with EPDM or rubber washer fixed into metal stud, through membrane and Tyvek® Double-Sided Tape.

C. All laps and penetrations in DuPont™ AirGuard® AVCL to be sealed with Tyvek® Metallised Tape.

D. AVCL dressed forward and sealed to floor with continuous strip of Tyvek® Butyl (double-sided) Tape



Above: DuPont™ AirGuard® AVCL – Installation onto SFS wall

Separating (Party) Walls

A party wall in domestic properties commonly refers to the dividing wall between adjoining semi-detached or terraced properties. In many cases the details and specifications can be shared with commercial projects such as offices, schools, sports and medical facilities. The purposes of each building can have an influence on the design and choice of building fabric, but in essence the principles of separation are common to all.

The various rooms or compartments incorporated within a commercially oriented building can often have very different functions from each other. The individual use of the rooms, the occupancy level, the appliances used within, the temperature and humidity and the specific requirements for ventilation make 'separation' a key factor in building design. It is important therefore that the environmental conditions that prevail within each room are maintained as efficiently as possible. This guidance is intended to offer typical examples of efficient and buildable solutions to achieve these goals, using a DuPont™ AirGuard® AVCL.

Performance factors to consider

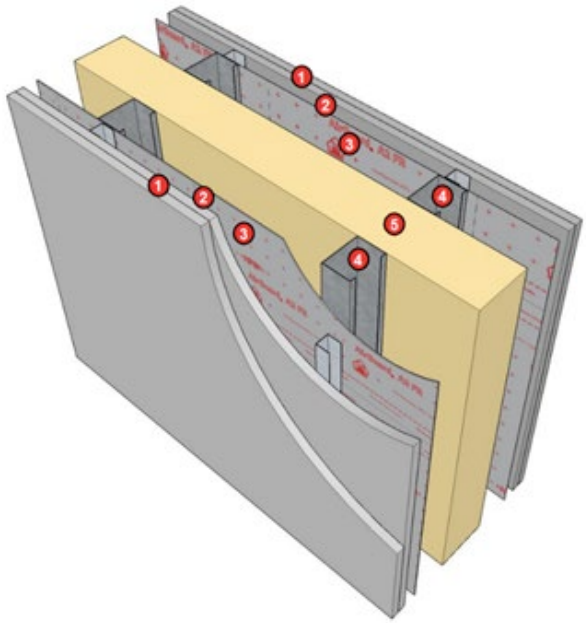
Energy Efficiency **Durability** **Moisture Control**

Air Quality **Sound Proofing** **Fire Safety**

Ventilated Façade Systems

Separating (Party) Walls

Steel frame: Double-stud system (Lightweight)



This diagram shows a double-stud SFS separating wall, suitable for lightweight steel frame houses and apartments. A flexible semi-rigid insulation fitted in the cavity, separates the twin steel frames. Either side is AirGuard® A2 FR AVCL providing airtightness, vapour control and fire safety, helping to maintain the individual air quality and energy efficiency characteristics between zones.

Seperating wall build-up

1. 2 layers of 15mm sound insulating plasterboard
2. Services void
3. DuPont™ AirGuard® AVCL (AirGuard® A2 FR)
4. Metal stud
5. Flexible insulation

Steel frame: Double-stud system

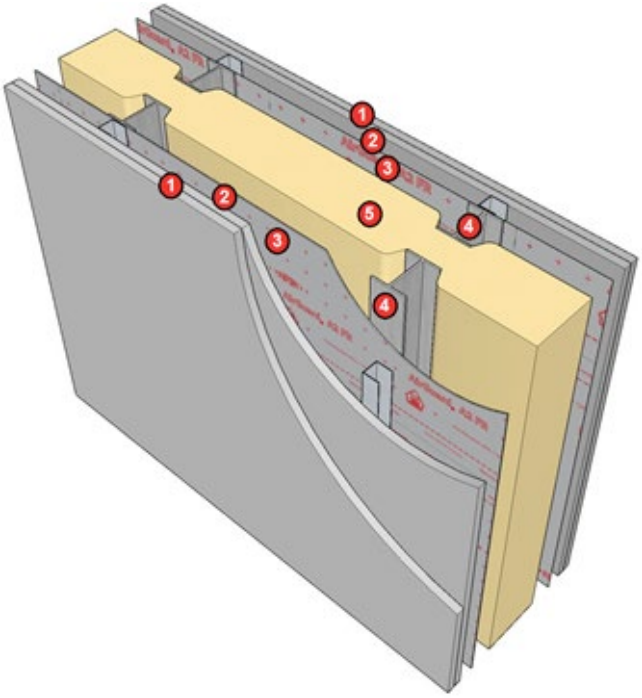


Diagram shows a steel frame 'double-stud' separating wall system, which would **only be used with a reinforced concrete frame construction**. Components are similar to the previously shown lightweight system, but with a compressible semi-rigid insulation fitted in the cavity, separating the twin steel frames. AirGuard® A2 FR AVCL is installed on both sides to provide airtightness, vapour control and fire safety, helping to maintain the individual air-quality characteristics between zones.

Separating wall build-up

1. 2 layers of 15mm sound insulating plasterboard
2. Services void
3. DuPont™ AirGuard® AVCL (AirGuard® A2 FR)
4. Metal stud
5. Flexible insulation

Recommended AVCL for separating wall systems:

DuPont™ AirGuard® A2 FR

Class A2 Non-Combustible Breather Membrane DuPont™ Tyvek® Trifecta™

Weather protection membrane for external wall systems



- Full A2-s1,d0 system:
  - DuPont Tyvek® Trifecta™ breather membrane (1.5m x 25m)
  - DuPont AirGuard® A2 FR AVCL (1.2m x 50m)
  - DuPont AirGuard® FR System Tape
- Suitable for use over any A1/A2 mineral boards
- Unrestricted use for high risk buildings, including height and proximity across the UK and Ireland
- Suitable for all building types including 'high risk'
- 6 months free exposure to UV
- Airtight for best possible heating and cooling savings
- W1 water resistance to EN 1928 (A) for effective weather protection
- Low vapour resistance for condensation control
- Extremely robust, with exceptional strength characteristics
- 25 year warranty



Class A2 Fire Retardant AVCL Membrane DuPont™ AirGuard® A2 FR

Airtight Vapour Control Layer for use within the internal lining of roof, ceiling and wall systems



FIRE RETARDANT

DuPont™ AirGuard® A2 FR AVCL: a Fire Retardant Airtight Vapour Control Layer for use within the internal lining of roof, ceiling and wall systems. Enhancing the building fabric in terms of airtightness, energy efficiency and moisture management, improving indoor air quality and providing exceptional fire safety to the building and its occupants.

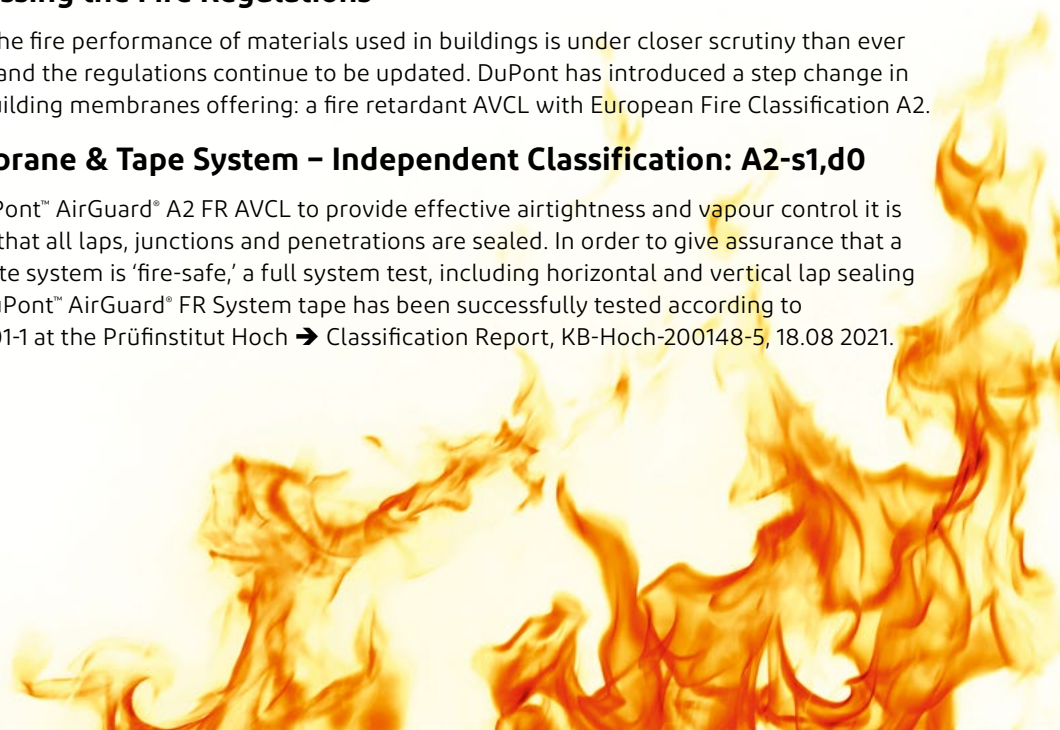
Surpassing the Fire Regulations

Today the fire performance of materials used in buildings is under closer scrutiny than ever before and the regulations continue to be updated. DuPont has introduced a step change in their building membranes offering: a fire retardant AVCL with European Fire Classification A2.

Membrane & Tape System – Independent Classification: A2-s1,d0

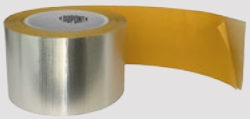
For DuPont™ AirGuard® A2 FR AVCL to provide effective airtightness and vapour control it is crucial that all laps, junctions and penetrations are sealed. In order to give assurance that a complete system is 'fire-safe,' a full system test, including horizontal and vertical lap sealing with DuPont™ AirGuard® FR System tape has been successfully tested according to EN 13501-1 at the Prüfinstitut Hoch ➔ Classification Report, KB-Hoch-200148-5, 18.08 2021.





DuPont™ AirGuard® A2 FR AVCL & tape system advantages at a glance

- Fire-retardant
- Reaction to fire: A2-s1, d0 to EN 13501-1: 2007+A1:2009
- AirGuard® A2 FR AVCL and DuPont™ AirGuard® FR System tape



DuPont™ AirGuard® FR System Tape 1310FR

- Tested and classified for free-span, on mineral wool slab, gypsum plasterboard or fibre cement board
- Fire Classification surpasses all national building regulations and standards for construction materials used in walls in the UK and Ireland
- Suitable for all building types, heights and proximities
- High vapour resistance, limiting interstitial condensation
- Suitable for high humidity buildings, such as swimming pool halls etc
- Thermal benefit; low emissivity/reflective surface
- 100% Airtightness
- Extremely robust
- Exceptional tear and tensile strength characteristics
- 25 year warranty



THE DUPONT™ TYVEK® BUILDING KNOWLEDGE CENTRE

www.building.dupont.co.uk

Tyvek® FireCurb® breather membrane advantages at a glance

- Compliance with national fire regulations and standards for use in high-rise buildings
- Reaction to fire: B-s1,d0
- Self-extinguishes when ignited - limits propagation of flames
- Class W1 essential water resistance to EN 13859
- Halogen-free flame retardant coating considerably limits the formation of droplets and reduces smoke
- Greater safety during and after installation
- Long term investment protection
- Has all the tried, tested and trusted properties Tyvek® is known for
- Strong technical support for all Tyvek® and AirGuard ® products

DuPont™ Tyvek® FireCurb® breather membrane

breather membrane for use in the external lining of wall systems



FLAME RETARDANT

Tyvek® FireCurb® breather membrane: a flame retardant breather membrane for buildings based on a new patented technology, enabling a Euroclass B (EN 13501-1) that potentially saves lives and could prevent costly damages.

The building breather membrane that limits the propagation of flames

DuPont introduced a new level of building protection with the flame retardant breather membrane Tyvek® FireCurb®. When flames meet Tyvek® FireCurb®, they literally stop, die down... and go out.
The membrane includes all of the well-known properties of Tyvek®, adding flame retardancy for even more comprehensive protection of walls.

Tyvek® FireCurb® breather membrane advantages at a glance



- Compliance with national Fire Regulations & Standards for use in high-rise buildings
- Reaction to fire: B-s1,d0
- Self-extinguishes when ignited - limits propagation of flames
- Halogen-free flame retardant coating considerably limits the formation of droplets and reduces smoke
- Greater safety during and after installation
- Long term investment protection

- Includes all durable Tyvek® characteristics essential for energy efficient and condensation free buildings:
  - Class W1 water resistance to EN 13859
  - Vapour resistance meets BS 5250 guidance for breather membranes (<0.6 MN.s/g)
  - **IMPORTANT**: Not all fire retardant breather membranes, on the market, reach the required sd and water vapour resistance standard <0.6MN.s/g

DuPont™ AirGuard® A2 FR AVCL

Properties CE	Nominal
Style name and D code	5816X (D Code:- D15561632)
Roll size	1.2m x 50m
Thickness	0.15 mm
Mass per unit area	165 g/m²
Composition	Laminate of glass fibre-mesh with lacquered Aluminium foil
Reaction to fire* (EN13501-1)	A2-s1,d0 (membrane)
Reaction to fire* (EN13501-1)	A2-s1,d0 (membrane & AirGuard® FR System tape)
Water vapour transmission (Sd)	4.900 m
Water vapour resistance	24.000 MN.s/g
Emissivity	0.05
Thermal resistance (with airspace)	Walls: 0.66 m²K/W / Ceilings: 0.45 m²K/W
Water tightness (EN1928)	Pass (Type A)
Tensile force MD/XD	800/800 (N/500)
Nail tear resistance MD/XD	170/150 (N/50 mm)

Tested freehanging & affixed on underlaying materials with EN13501-1 fire class A1 or A2-s1, d0.

IMPORTANT: To compliment this product, a flame retardant breather membrane should be used on the external side of the wall system. For this purpose, we would recommend you use DuPont™ Tyvek® FireCurb®. Please see www.flameretardant.tyvek.com

DuPont™ Tyvek® FireCurb®

Properties CE	Nominal
Style name and D code	2066B (D Code:- D15085129)
Dimensions / Weight	1.5 x 50 m / 5.5 kg per roll
Composition	Flash-spun-bond HDPE with flame retardant coating
Reaction to fire*	(EN13501-1) B-s1,d0
Temperature resistance	-40 to +100° C
Water vapour transmission (Sd)	0.015 m
Water vapour resistance	0.075 MN.s/g (less than 0.6 MN.s/g to BS 5250:2011)
Mass per unit area	68 g/m²
Functional layer thickness	175 µm
CE-Certificate of Conformity	yes (0799-CPD-128)

*(if installed freehanging, on mineral wool & cementitious boarding--> B-s1,d0 , if installed onto wood --> D-s2,d2)

IMPORTANT: To compliment this product in roof, ceiling and wall systems, a fire retardant air and vapour control layer (AVCL) should be used within the internal lining. For this purpose we would recommend you use DuPont™ AirGuard® A2 FR.

To achieve optimal airtightness, we recommend the use of the following adhesive accessories.

Tyvek® Acrylic Tape

Roll size:
75 mm x 25 m



AirGuard® FR System Tape

Roll size:
75 mm x 25 m



Tyvek® Butyl Tape

Roll size:
20 mm x 30 m or
50 mm x 30 m



Tyvek® Double-sided Tape

Roll size:
50 mm x 25 m



Tyvek® FlexWrap NF/EZ
(Check for maximum tape width permitted)

Roll size Tyvek® FlexWrap NF:
15 cm x 23 m

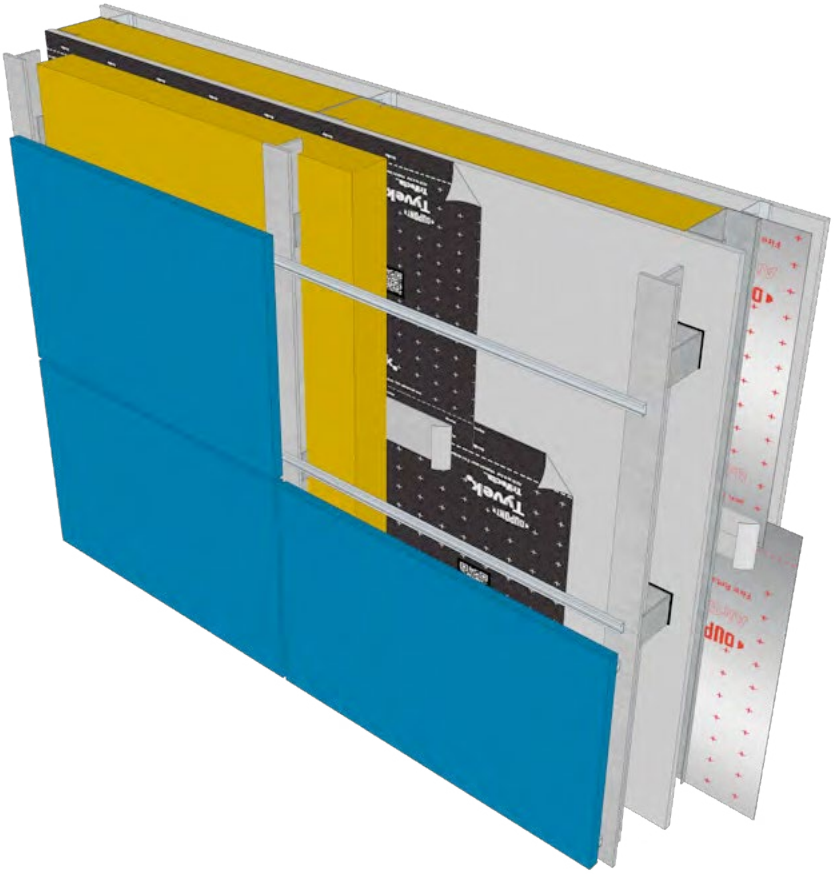


Roll size Tyvek® FlexWrap EZ:
60 mm x 10 m



DuPont™ Tyvek® Trifecta® breather membrane

Breather membrane for use in the external lining of wall systems.



DuPont™ Tyvek® Trifecta®

Properties CE	Nominal
Style name and D code	2021B
Dimensions / Weight	1.5 m x 25m 15kg
Reaction to fire (EN13501-1)	A2-s1,d0
Water vapour transmission (Sd)	0.08 m
Water vapour transmission (Sd)	0.015 m
Mass per unit area	400g/m²
CE-Certificate	Yes
BBA Certificate	N° 90/2548 pending

***Application:** Tyvek® Trifecta™ is typically installed onto the external side of the insulation material or integrated in the wall structure system. It can be used as a solution for ventilated façades.

ENHANCED FIRE AND SMOKE PROTECTION

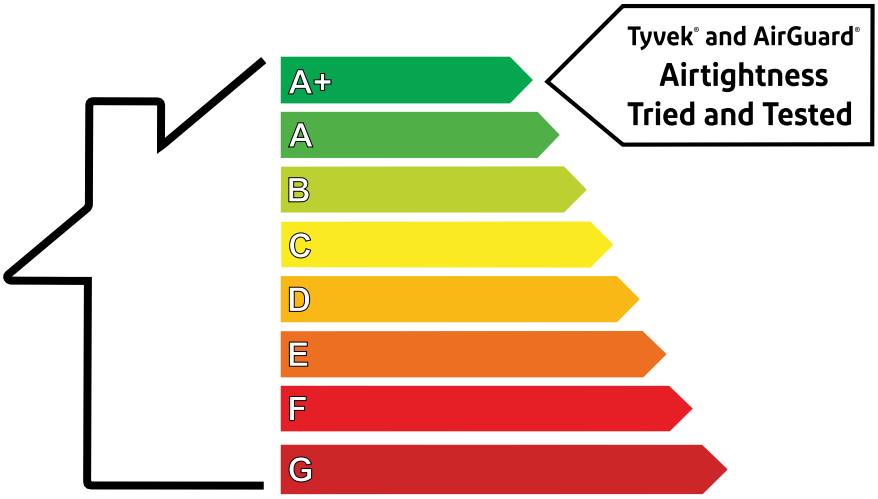
These tried and tested products not only provide exceptional fire and smoke protection and peace of mind for occupants – they also enhance a building's airtightness and air quality while improving energy efficiency and moisture management.

www.FlameRetardant.tyvek.com
www.building.dupont.co.uk
www.energy-efficiency.dupont.com

DuPont™ Tyvek® and DuPont™ AirGuard®

DuPont™ Tyvek® is at the forefront of building science, meeting the building codes of today and the future with construction materials you can trust. For the ultimate energy efficiency solution and the inner strength that buildings need, DuPont™ Tyvek® partners AirGuard®, for superior performance and reliability in internal airtightness. With today's focus on the reduction of emissions and improved energy efficiency, you can count on a brand that has been at the heart of building solutions for decades and has a global building knowledge network. Tyvek® and AirGuard® are your guarantee of unbeatable energy efficiency.

With Tyvek® and AirGuard®, Trust is Built In.




Tyvek

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The DuPont™ Tyvek®
Building Knowledge Center

– Science you can build on –

www.building.dupont.co.uk
www.energy-efficiency.dupont.com

The DuPont™ Tyvek® Building Knowledge Centre is a resource for building envelope installation and design best practices. It's a dedicated source for information about evolving building regulations, sustainable building practices and air, water and thermal management, that can help you:

- Select building envelope materials and techniques
- Meet or exceed building standards
- Enhance energy efficiency
- Maintain interior air quality
- Improve building durability
- Increase job site efficiency
- Develop project-specific specifications and plans

All technical data sheets, installation guides and certificates are available to download from the document section of our website.

You can also contact the technical or sales team by phone or email:
Main office: +44 (0) 117 452 9050
Option 1 for Technical assistance
Option 2 for Pricing and enquiries
Option 3 for invoicing, order acknowledgments and customer order processing

Technical team email: tyvek.construction@dupont.com



BIM
BUILDING INFORMATION MODELLING

For help with projects please contact our technical team at the Tyvek® Building Knowledge Centre or one of our Regional Managers (details above and on our websites) For Installation guides and videos, technical data sheets, certification, case studies and other useful information

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