



**NSAI**  
Agrément

**IRISH AGRÉMENT BOARD  
CERTIFICATE NO. 05/0214**

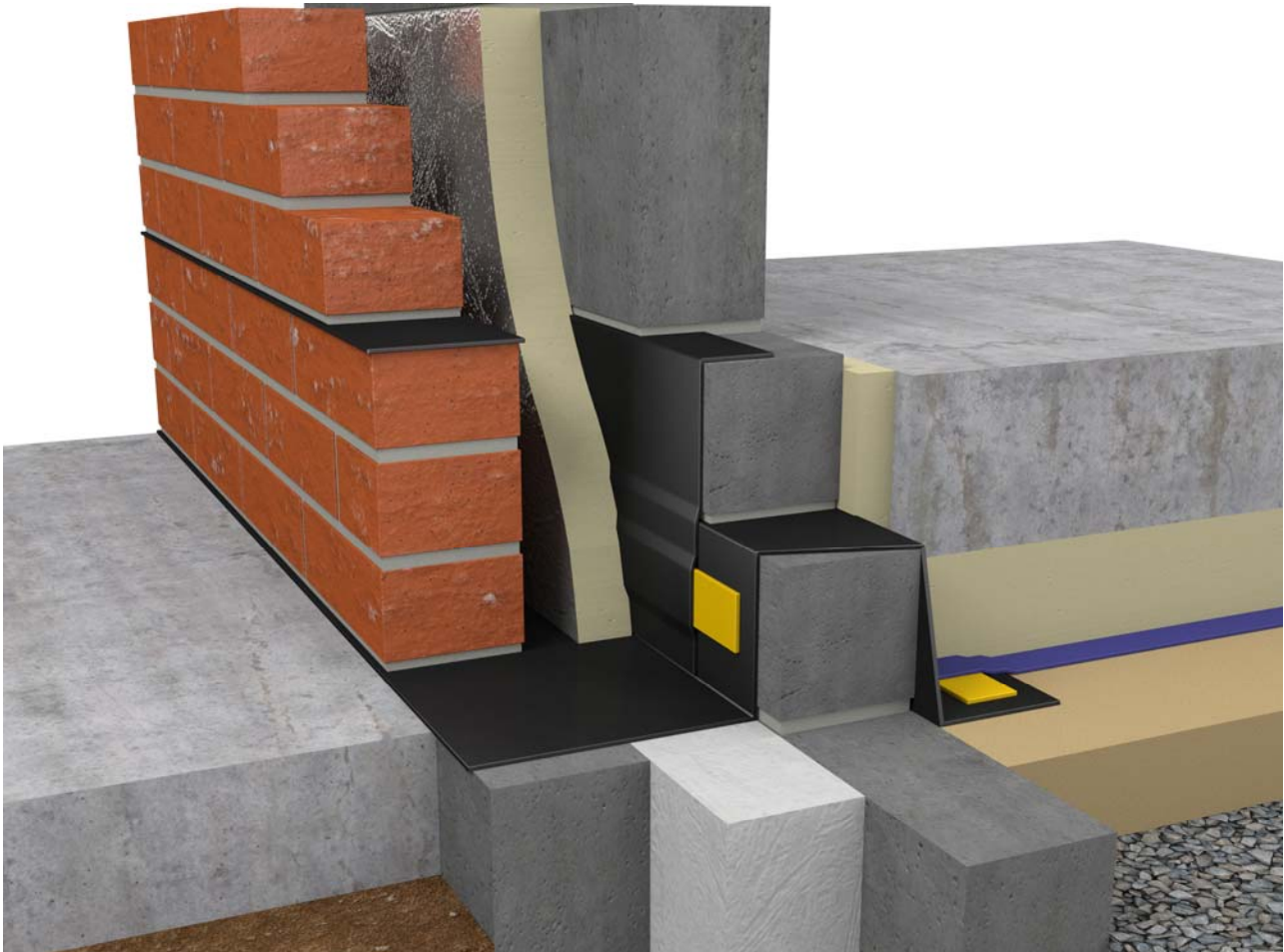
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## Visqueen Ultimate RadonBlok Radon, Air and Damp Protection System

### Système de barrière Sperrsystem

**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 Visqueen Ultimate RadonBlok – radon air and damp barrier system for ground floors in buildings. The system provides protection from sealing floors to walls, and complex detailing such as service pipe penetrations and corners.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2017.

#### USE:

Radon (incl. RN-222, RN-220, RnD) is a naturally occurring radioactive gas, which enters buildings from the underlying soil. This gas can accumulate within a building to such a concentration as to constitute a health hazard. Radon is excluded from buildings using passive and active systems. The provision of a suitable protection system, designed and installed by competent personnel, will substantially reduce the risk of a building having radon activity above a recommended target health level of 10-40 Bq/m<sup>3</sup> (USA).

A passive radon, air and damp protection system effectively deals with:

- Floor areas – Require a radon resistant membrane correctly sealed and joined to the perimeter of the internal wall;
- Load bearing areas – A radon resistant damp proof course (DPC) must be jointed to the radon membrane at perimeters before passing the load bearing areas (walls) including cavities. Appropriate radon resistant cavity trays and pre-formed corner units may be required;
- Structural or service penetrations – Must be sealed with top hats, detailing strips or liquid sealants where appropriate to provide a continuous radon seal.

A passive control system can convert into an active control system by incorporating underfloor sumps, by the use of appropriate ventilation fans.

**Note: DPMs must be CE marked to IS EN 13967:2012 Flexible sheets for waterproofing – Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet – Definitions and characteristics.**

#### **MANUFACTURE & MARKETING:**

The product is manufactured by:

Visqueen,  
Maerdy Industrial Estate,  
Rhymney,  
Tredgar NP22 5PY,  
South Wales.

The product is marketed by:

Visqueen Building Products,  
Heanor Gate Industrial Estate,  
Heanor,  
Derbyshire DE75 7RG,  
UK.

### **1.1 ASSESSMENT**

In the opinion of NSAI Agrément, Visqueen Ultimate RadonBlok System 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 Irish Agrément Certificate.

### **1.2 BUILDING REGULATIONS 1997 to 2017**

#### **REQUIREMENTS:**

#### **Part D – Materials and Workmanship**

**D3** – Visqueen Ultimate RadonBlok System, as certified in this Certificate, is comprised of ‘proper materials’ fit for their intended use (see Part 4 of this Certificate).

**D1** – Visqueen Ultimate RadonBlok System, as certified in this Certificate, meets the requirements of the building regulations for workmanship.

#### **Part A - Structure**

##### **A1 – Loading**

Visqueen Ultimate RadonBlok System installed in accordance with this Certificate, will not adversely affect the designed safety and deflection characteristics of a building.

#### **Part B – Fire Safety**

##### **Part B Vol 2 – Fire Safety**

##### **B3 & B8 – Internal Fire Spread (Structure)**

Visqueen Ultimate RadonBlok System installed in accordance with this Certificate will not adversely affect the control of fire and smoke within concealed spaces in the structure or fabric of a properly designed building.

#### **Part C – Site Preparation and Resistance to Moisture**

##### **C3 – Dangerous Substances**

Visqueen Ultimate RadonBlok System, when used as an integral part of a radon protection system, will meet this requirement with respect to radon gas.

##### **C4 – Resistance to Weather and Ground Moisture**

Visqueen Ultimate RadonBlok System, when used in accordance with Part 3 of this Certificate, will meet this requirement.

Product	RadonBlok <sup>400</sup>	RadonBlok <sup>600</sup>	Zedex CPT
Application	Radon DPM	Radon DPM	Radon DPC
System type	Tape	Welded	Tape or welded
Roll size (m)	2 x 25	2 x 25	Various
Mass (g/m <sup>2</sup> )	380	580	760
Nominal thickness (µm)	400	600	800
Colour	Purple	Purple	Black
Technical Performance			
Tensile strength (MPa)	22	23	21
Elongation (%)	826	890	830
Moisture resistance transmission rate (g/m <sup>2</sup> /day)	0.18	0.12	0.4
Water vapour resistance (MNs/g)	798	1188	372
Radon permeability (10 <sup>-12</sup> m <sup>2</sup> /s)	7.5	5.7	8.3
Resistance to impact (mm)	350	600	400
Joint strength (N/50mm)	250	400	235
Durability of watertightness against artificial ageing	Pass	Pass	Pass
Durability of watertightness against chemicals	Pass	Pass	Pass

**Table 1: Product Specification**

## 2.1 PRODUCT DESCRIPTION

A product specification is shown in Table 1.

### 2.1.1 System Components

#### Floor areas

- Visqueen Ultimate RadonBlok<sup>400</sup> tape jointed system
  - 2m x 25m.
  - A high performance radon barrier membrane that utilises the latest polymer technology. It is soft flexible and easy to use.
- Visqueen Ultimate RadonBlok<sup>600</sup> welded system
  - 2m x 25m.
  - A high performance membrane that has been specially formulated for the latest hot air welding methods.
- Visqueen RadonBlok Double & Single Sided Jointing Tape
  - 30mm x 30m; 75mm x 33m.
  - A double sided radon resistant butyl tape and single sided cross weave tape designed for sealing joints in the Visqueen radon membranes.
- Visqueen Ultimate Double & Single Sided Jointing Tape
  - 30mm x 10m; 75mm x 10m.
  - A membrane joint system for extreme conditions.

- Visqueen Treadguard
  - A protective layer to ensure radon membranes are not damaged by following trades.

#### Loading bearing areas (walls)

- Visqueen Zedex CPT DPC
  - Various sizes available.
  - A flexible radon resistant DPC including for cavity tray applications.
- Visqueen Preformed Units (PFU)
  - Various sizes to suit 100mm to 225mm upstands.
  - Preformed bespoke units to effectively seal corners.

#### Service penetrations

- VisqueenPro Detailing Strip
  - 300mm x 10m.
  - A high performance single sided tape for sealing around various complex sections.
- Visqueen Top Hat Units
  - 100mm to 160mm.
  - A flexible or pre-formed top hat for sealing around pipe penetrations.
- Visqueen Axiom UniSeal
  - 5.2kg or 15.6kg.
  - A two-part radon resistant liquid membrane for sealing around pipe clusters.
- Visqueen RadonBlok Sump
  - 460mm diameter, 110mm outlets.
  - A roto-moulded PVC unit consisting of four equidistant outlets. The outlet positions are

easily cut on site to allow vent pipes to be attached for extraction and dispersion of radon into the atmosphere.

## 2.2 MANUFACTURE

Visqueen Ultimate RadonBlok System is manufactured by a polythene extrusion process.

### 2.2.1 Quality Control

Quality control checks are carried out on the incoming raw materials, during production and on the finished product. These checks include dimensions, tensile strength, impact strength, elongation, weight.

## 2.3 DELIVERY, STORAGE AND MARKING

Rolls are supplied on pallets, in wrappers bearing the manufacturer's name and product description, NSAI Agrément identification mark, NSAI Agrément Certificate number and essential instructions for storage and installation. Please refer to manufacturer's technical datasheets for system components.

## 2.4 INSTALLATION

### 2.4.1 General

The Visqueen Ultimate RadonBlok System offers a robust solution for various foundation designs. The complete system allows designers and installers to select the best system for their project by combining the DPC to radon membrane.

Guidance on the design of radon protection systems for new and existing buildings is given in the DHPLG document *Radon in Buildings* and in the BRE (UK) document *Radon – Guidance on protective measures for new dwellings*. It is essential that the product is laid in accordance with the recommendations of IS EN 1996-1-1:2005+A1:2012 *Eurocode 6 – Design of masonry structures – Part 1-1: General rules for reinforced and unreinforced masonry structures (including Irish National Annex)*, BS 8102:2009 *Code of practice for protection of below ground structures against water from the ground*, and with this Certificate. Additional guidance on the use of damp proof membrane materials is given in BS 8000-4:1989 *Workmanship on building sites – Code of Practice for waterproofing*.

### 2.4.2 Design Details

Visqueen Ultimate RadonBlok System can be used in most common floor constructions. It is installed in a similar way to damp proof membranes, but with much greater attention to sealing, detailing and workmanship. The radon barrier will also perform the same function as a damp proof membrane.

To be fully effective, a radon barrier must bridge cavities in walls to the exterior of the building. All designed cavities must be properly closed.

To avoid creating slip planes in masonry walls, a damp proof course should not be laid on the same course of blockwork as the Visqueen Ultimate RadonBlok System (see the recommendations in IS EN 1996-1-1:2005+A1:2012).

Consideration must be given to the positioning of a radon barrier in relation to thermal insulation. The recommendations contained in IS EN 1996-1-1:2005+A1:2012 and the BRE Report *Thermal Insulation – avoiding risks* should be followed.

The integrity of a radon barrier must be maintained during installation. The Visqueen Ultimate RadonBlok System is resistant to puncturing and tearing, but where damage occurs this must be repaired by covering with a second layer of membrane, overlapped by at least 150mm, sealed with double sided tape and secured with single sided jointing tape.

Sheets must be clean and free from dirt and grease before application, and in view of the difficulty of achieving gas tight seals under wet or dirty site conditions it is recommended that special care be taken with this aspect of the installation.

### 2.4.3 Installation Procedure Sumps

Where sub floor depressurisation is required, then the Visqueen RadonBlok Sump should be used, located as close to the centre of the building as possible. All pipe work connecting to the sump should be fully sealed using the jointing tape system. A venting pipe should be connected to the sump, which needs to leave the building. Until such time as a fan is installed, the pipe should be capped (Note: a sump is only installed as a fallback measure and does not provide any radon removal until a fan is installed or is connected to a passive stack system).



**Figure 1: Visqueen RadonBlok Sump**

### Preparation

The membrane should be installed on a blinded or smooth surface to prevent puncture of the membrane during installation.

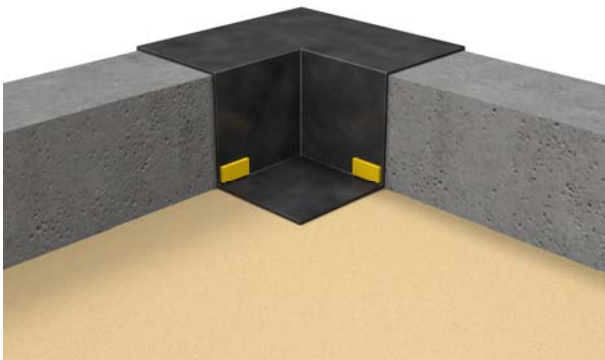
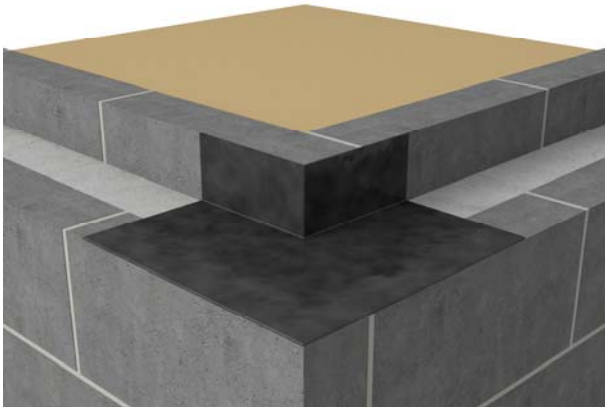
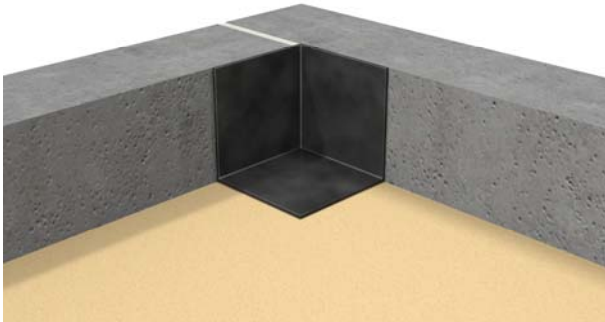


**Welding**

Visqueen Ultimate RadonBlok<sup>600</sup> is designed for welded joints. The installation procedures below illustrate a taped system which is recommended with RadonBlok<sup>400</sup>, however – where necessary – a taped system is acceptable with RadonBlok<sup>600</sup>.

**Stage 1: Sealing at corners and walls**

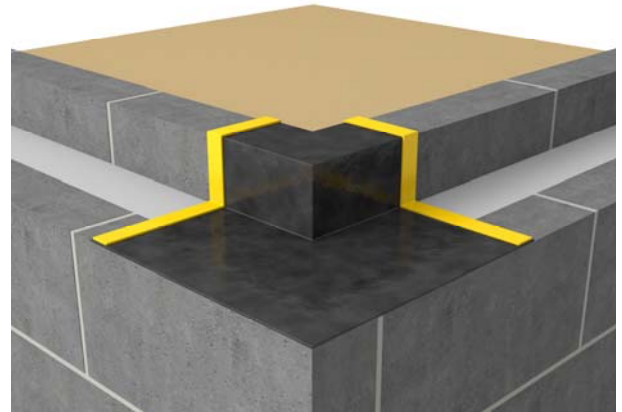
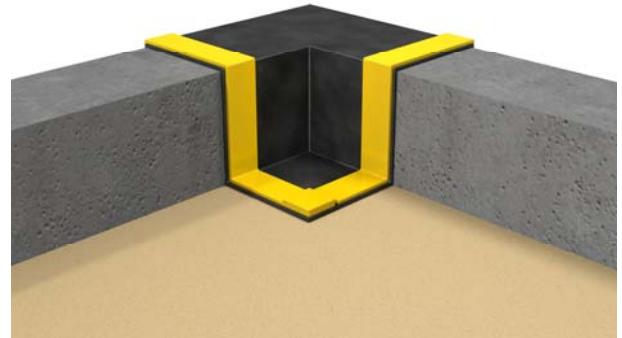
Use Visqueen Preformed Corner units with the appropriate upstand size – alternatively the unit can be trimmed – at both the internal and external corner. Connection between the up and downstand units is created by using Visqueen RadonBlok Double Sided Jointing Tape.



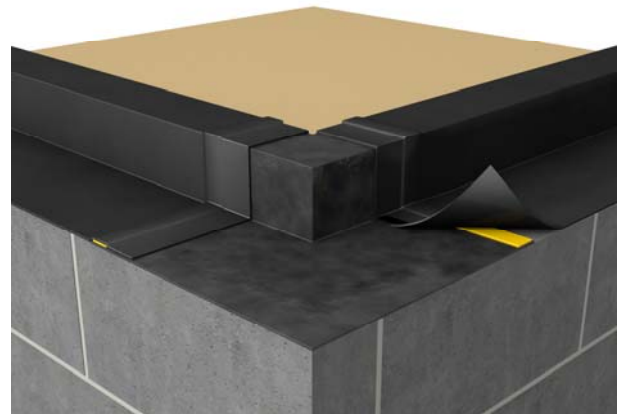
**Stage 2: Connection between corners and DPC**

Apply two strips of Visqueen RadonBlok Double Sided Jointing Tape 50mm from edge of the

corner units. The two strips should extend from the outside corner unit to the internal, and fully lap at the base of the internal corner unit.



The appropriate sized Visqueen Zedex CPT Radon DPC should be placed on the entire length of each wall and lapping the corner units by 150mm. The DPC should be taken over the upstand and down to meet the blinding floor area at least 150mm on the horizontal.



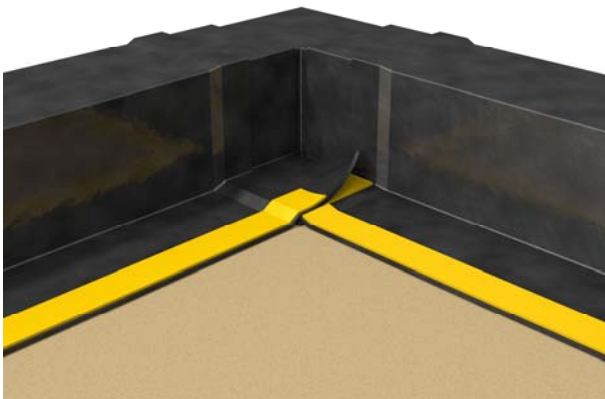
If the external side of the DPC does not finish above ground level, an additional DPC will be required (see Figure 2).



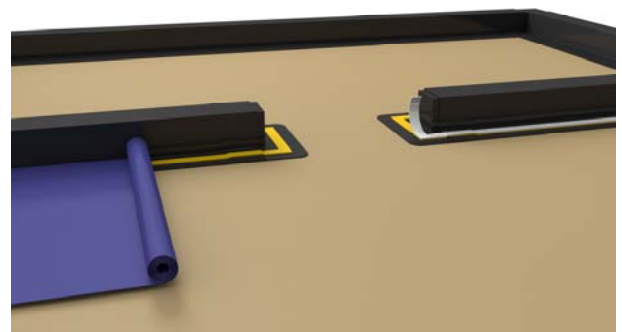
**Figure 2: Use of Additional DPC**

**Stage 3: Floor to wall junctions**

Apply Visqueen RadonBlok Double sided Jointing Tape along the internal horizontal part of the DPC approximately 50mm from the edge.

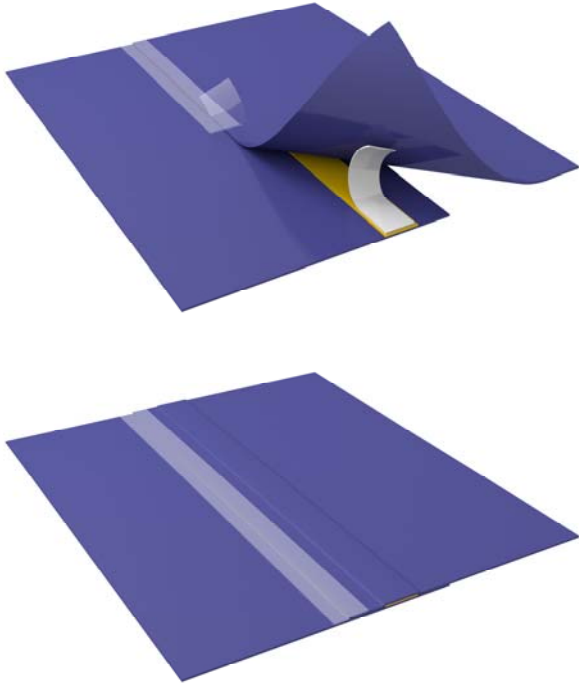


Use a hard rubber roller to seal down the tape and carefully release the backing paper. Apply the appropriate Visqueen Ultimate RadonBlok membrane at a 150mm overlap. Again use a hard rubber roller to ensure an effective airtight seal.



#### Stage 4: Membrane jointing

All membrane joints should be overlapped by 150mm to ensure a radon tight seal. Bond the membranes together by applying the Visqueen RadonBlok Double Sided Jointing Tape 50mm from the one edge. Overlap the next membrane by at least 150mm and seal the edge with Visqueen RadonBlok Single Sided Jointing Tape.



When welded joints are required for Visqueen Ultimate RadonBlok<sup>600</sup>, specialist equipment is required and the manufacturer must be contacted.

#### Stage 5: Punctures

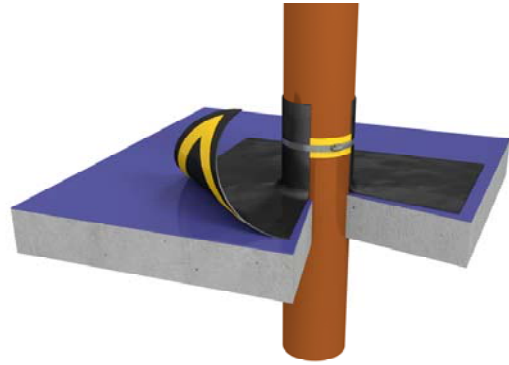
Punctures to the membrane can only be repaired by using a patch of the same membrane and lapped at least 150mm beyond the limits of the puncture. Bond and seal the patch using the Visqueen jointing tape system as per Stage 4.

When a welded joint system is being used, punctures to the membrane can only be repaired by welding a patch of membrane with identical thickness and lapped at least 150mm beyond the limits of the puncture. Where this is not possible and the three dimensional shapes are complex, it is recommended that a preformed unit is used.

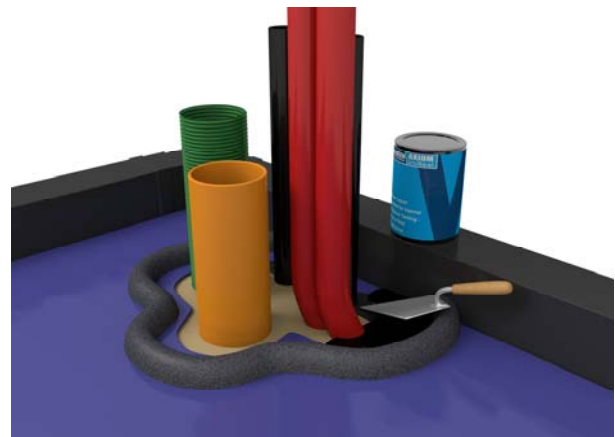
#### Stage 6: Penetrations

The following methods can be used:

1. Service pipe penetrations should be fully sealed using Visqueen Preformed Top Hat Units. The base and collar of the preformed unit should be bonded using Visqueen RadonBlok Double Sided Jointing Tape and sealed with Visqueen Single Sided Jointing Tape. The collar should be secured with a mechanical fastening.



2. Multiple pipe penetrations should be fully sealed using Visqueen Axiom UniSeal. Cut the membrane as close to the pipes as possible and apply a formwork around the pipework (at least 30mm should be left inside that is the radon membrane) to facilitate the liquid membrane and curing. Reference should be made to the manufacturer's datasheet for mixing the two components. Once the mix is ready, apply Visqueen Axiom UniSeal using a trowel around the penetrations and cover the entire enclosed area inside the formwork with the liquid membrane. Touch dry should be achieved within 3 hours.



#### Stage 7: Protection

A screed or other protective layer such as Visqueen TreadGUARD should cover Visqueen Ultimate RadonBlok membrane as soon as possible after installation. Care should be taken to ensure that the membrane is not punctured, stretched or displaced when applying the screed or concrete. A minimum thickness of 50mm screed is recommended.

When reinforced concrete is to be laid over the barrier, the wire reinforcements must be prevented from contacting the barrier. It is recommended that the barrier is covered with screed before positioning the reinforcement.

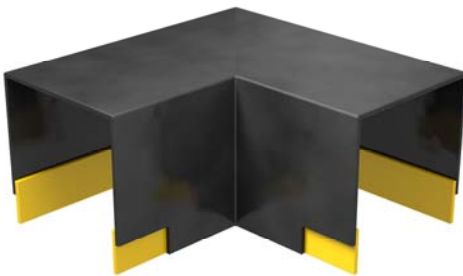
When underfloor heating is being installed, it is recommended that the Visqueen Ultimate RadonBlok membrane is positioned between the blinded hardcore and the insulation to protect the

installation from moisture and to avoid any risk of overheating the membrane. External and internal corners should be rounded. Where this is unavoidable, the angles must be strengthened with a 300mm wide strip of the membrane.

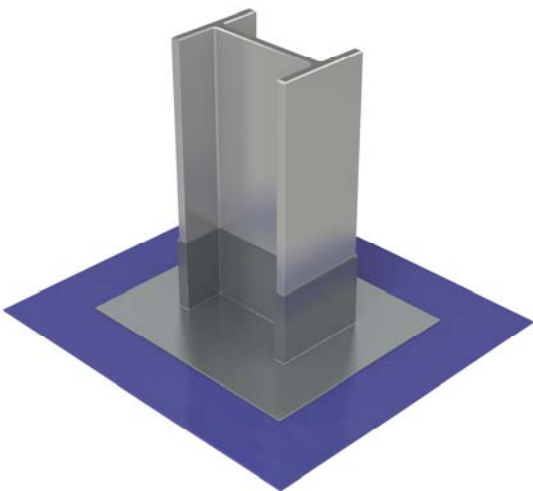
### Other System Components



**Figure 3: Visqueen T Corner Unit**

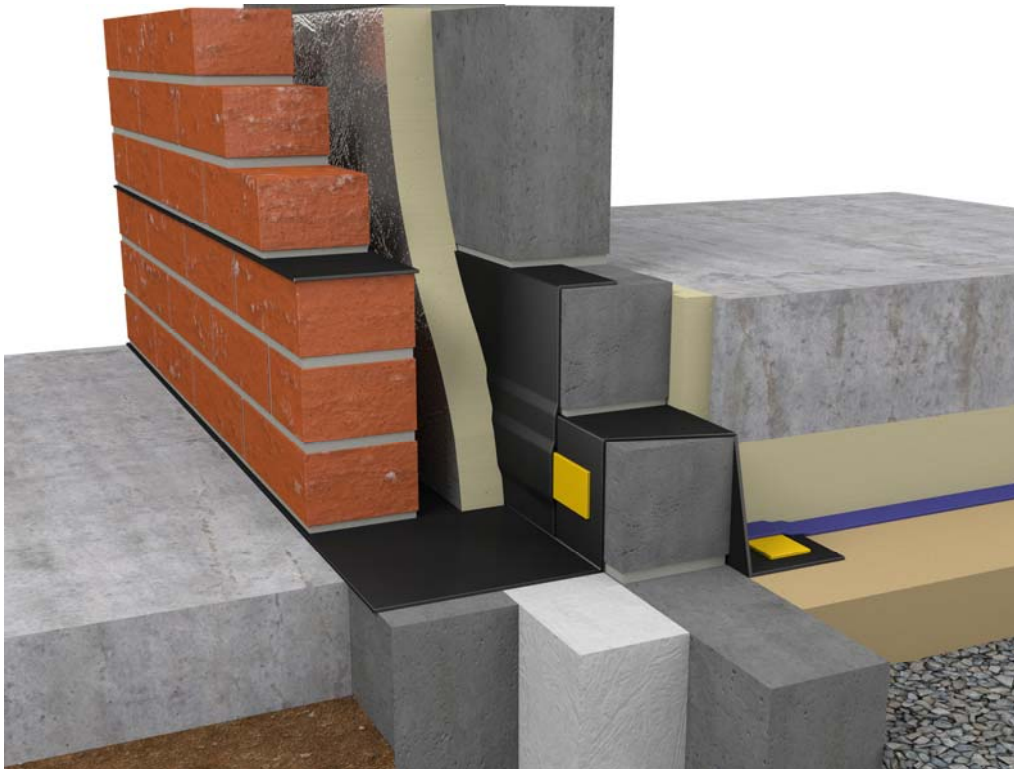


**Figure 4: Visqueen Corner Unit**



**Figure 5: Visqueen Pro Detailing Strip at Steel Stanchion**





**Figure 6: Visqueen Ultimate RadonBlok System on Ground Bearing Slab**



**Figure 7: Suspended Slab Detail**



Figure 8: Visqueen Ultimate RadonBlok System Below Ground Bearing Slab

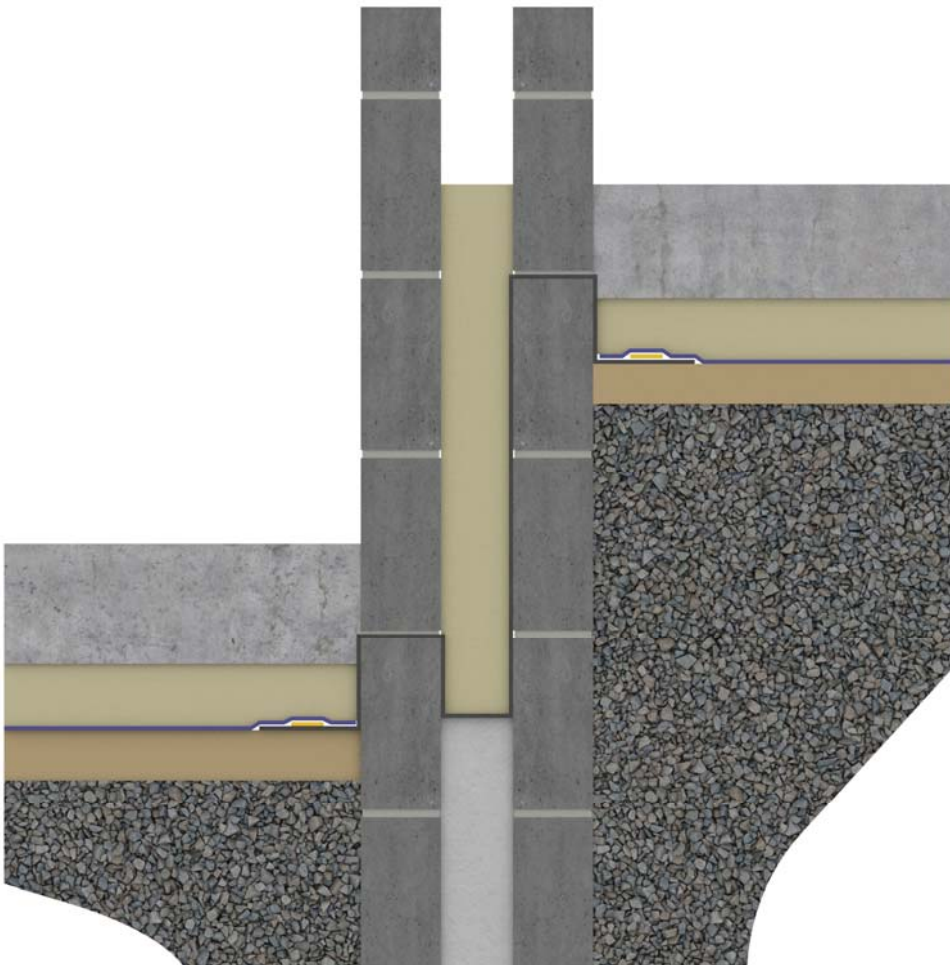
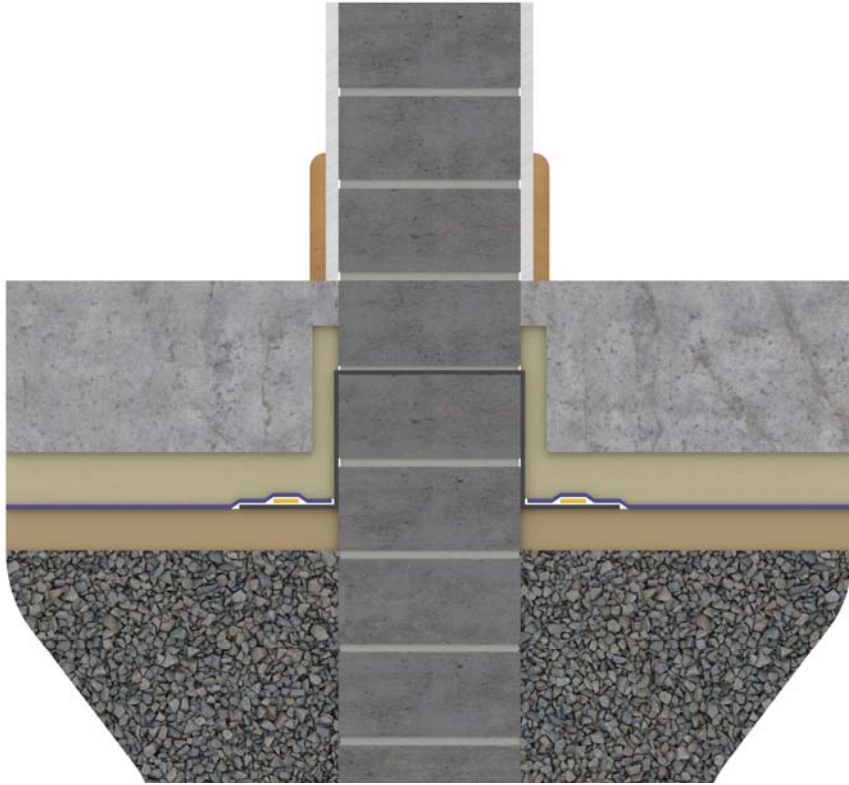


Figure 9: Detail Showing System on a Ground Bearing Slab Change of Level Design



**Figure 10: Detail Showing System at an Internal Wall**



**Figure 11: Visqueen Ultimate RadonBlok System on a Raft Foundation**



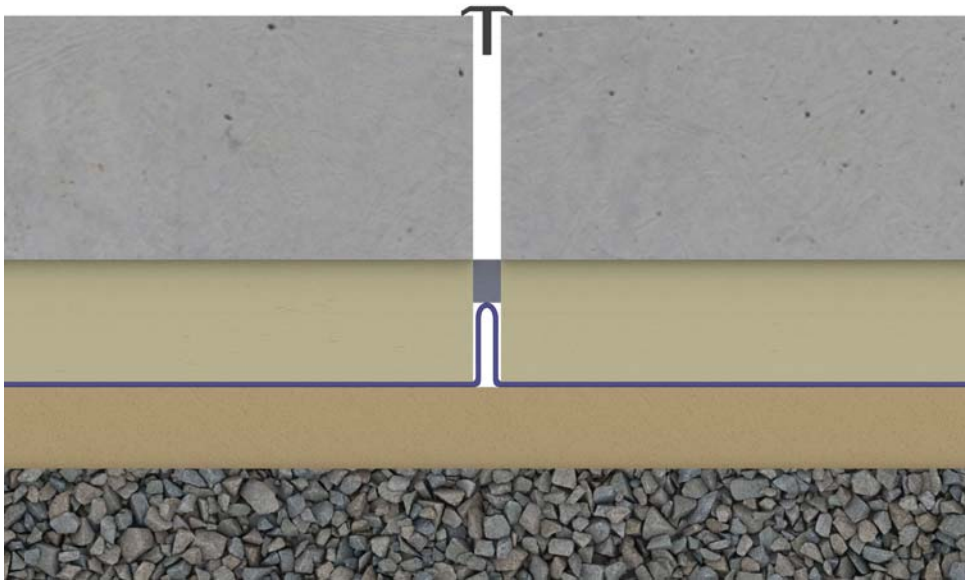


Figure 12: Construction Joint

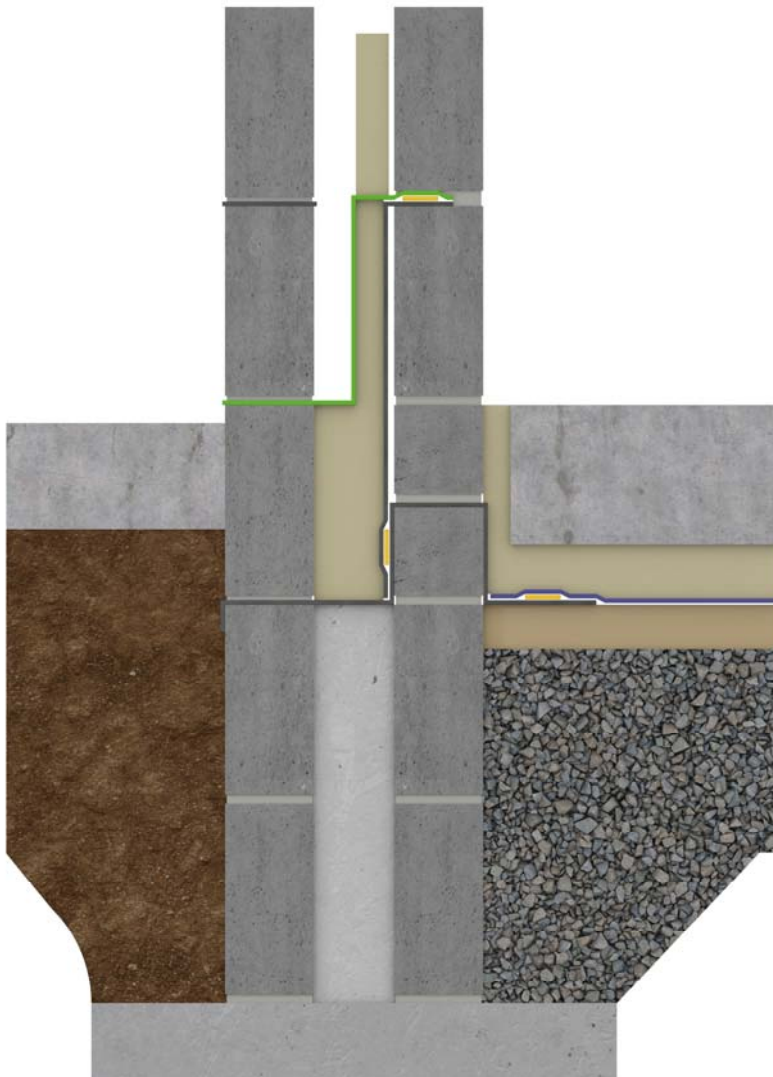


Figure 13: System on a Ground Bearing Slab with Cavity Tray



### 3.1 GENERAL

Visqueen Ultimate RadonBlok System is suitable for use in concrete floors not subject to hydrostatic pressure, in accordance with the relevant clauses of IS EN 1996-1-1:2005+A1:2012 and BS 8102:2009. The product can be installed as an over-site membrane, either between a sand blinded hardcore (50mm of sand minimum) bed and the base concrete, or laid on top of high-density insulation (25kg/m<sup>3</sup>) with a concrete screed laid over it.

#### 3.1.1 Resistance to Radon, Water and Water Vapour

The membrane and methods of jointing provide an effective barrier to the passage of radon gas, liquid water and water vapour from the ground.

#### 3.1.2 Resistance to Tear and Puncture

The product has a high resistance to tear. Care should be taken during installation, particularly when handling building materials and equipment over the surface and when placing concrete or screeds, since the membrane can be punctured by sharp objects. When installed as set out in this Certificate, there should be a minimum risk of puncture or tear damage. High-density insulation (25kg/m<sup>3</sup>) is an effective protection after laying.

#### 3.1.3 Site Conditions

The product may be installed in all conditions normal to ground floor slab construction. Where there is a risk of ground becoming waterlogged, sub-soil drainage must be provided in accordance with IS EN 1996-1-1:2005+A1:2012 and BS 8102:2009.

#### 3.1.4 Underfloor Heating

When used in accordance with the conditions set out in this Certificate, there will be no adverse effect on the membrane from underfloor heating under normal conditions.

### 3.2 CONSTRUCTION DETAILING

To reduce radon gas migration/ingress into buildings the following guidelines should be followed:

- Design for controlled movement of construction (see IS EN 1996-1-1:2005+A1:2012)
- Ensure that all designed cavities are effectively closed to interior spaces
- Design for grouping of services, with effective gas seal of ground slab openings and penetrations

### 3.3 CONSTRUCTION SETTLEMENT

Consideration should be given to differential and/or relative settlement of ground floor construction during the full life cycle of the building.

Where special installation detailing is introduced, i.e. folding of a radon resisting membrane at critical construction points, an elongation capability for the membrane itself may not be required. Where high concentrations of radon are likely and where a building is properly designed, detailed and constructed to take account of settlement, the installation of the Visqueen Ultimate RadonBlok System represents an effective measure against radon health hazards.

### CONSTRUCTION DETAILING – PROVISION FOR SETTLEMENT

#### Situation A:

If it can be predicted with certainty that there will be no actual/real relative or differential settlement during the entire cycle of a building, Visqueen Ultimate RadonBlok System may be installed as shown:



#### Situation B:

If it can be predicted with certainty that the actual/real relative or differential settlement during the entire life cycle of a building will not exceed 8mm, Visqueen Ultimate RadonBlok System may be installed with an upstand as shown:



#### Situation C:

If it cannot be predicted with certainty what the actual/real relative or differential settlement will be during the entire life cycle of a building, Visqueen Ultimate RadonBlok System should be installed with folds as shown:



#### 4.1 MAINTENANCE

No maintenance of a radon resisting membrane is required when installed in accordance with this Certificate.

#### 4.2 DURABILITY

When installed in accordance with this Certificate and subject to normal conditions of use, the membrane will provide an effective barrier, which will be substantially impervious to the transmission of radon gas, liquid water and water vapour for the life of the building.

Long periods of exposure to ultraviolet light can reduce the effectiveness of a membrane. However, during storage, and when installed in accordance with this Certificate, the membrane will be protected from such exposure.

It is important to note that alterations to the building structure subsequent to the installation of a radon protective system must take into account the integrity of the radon resisting membrane.

#### 4.3 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

Table 1 gives a summary of the technical investigations carried out on the Visqueen Ultimate RadonBlok System.

#### 4.4 OTHER INVESTIGATIONS

- (i) Existing data on product properties in relation to fire, toxicity, environmental impact and the effect on mechanical strength/stability and durability were assessed. When stored with normal care on site prior to installation, the membrane will not present a significant fire or health hazard.
- (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.

**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 latest revision 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.

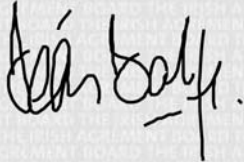
**5.7** Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it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

## NSAI Agrément

This Certificate No. **05/0214** is accordingly granted by the NSAI to **Visqueen** on behalf of NSAI Agrément.

Date of Issue: **February 2005**

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.n Sai.ie](http://www.n Sai.ie)

**Revisions: March 2013, 4<sup>th</sup> January 2018**

- Change of thickness of membrane
- References to Building Regulations and standards updated.