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Agrément Certificate

18/5491

Product Sheet 2

XP WATERPROOFING SYSTEM

COREFLEX XP FOR BELOW GROUND

This Agrément Certificate Product Sheet⁽¹⁾ relates to COREFLEX XP⁽²⁾, a thermoplastic membrane integrally bonded to an active hydrophilic polymer composite for use in waterproofing and damp-proofing below ground reinforced concrete structures which are under continuous or intermittent hydrostatic pressure.

(1) Hereinafter referred to as 'Certificate'.

(2) COREFLEX XP is a registered trademark.

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

Resistance to water and water vapour — the product, including joints, provides an effective barrier to the passage of liquid water and water vapour from the ground (see section 6).

Resistance to underground gases — the product will provide an effective barrier to radon (see section 7).

Resistance to mechanical damage — the product provides adequate resistance to damage and has the capacity to self-repair if punctured (see section 8).

Durability — when fully protected, the product provides an effective barrier to the transmission of water and water vapour for the life of the structure in which it is incorporated (see section 13).



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 First issue: 30 April 2018

John Albon – Head of Approvals
Construction Products

Claire Curtis-Thomas
Chief Executive

Certificate amended on 5 September 2018 to correct generic title and specific title.

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 are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.
Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

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Regulations

In the opinion of the BBA, COREFLEX XP, 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:	C1(2)	Site preparation and resistance to contaminants
Comment:		The product, including joints, can contribute to a structure satisfying this Requirement with regards to radon. See section 7.1 of this Certificate.
Requirement:	C2(a)	Resistance to moisture
Comment:		The product is an effective barrier to water and water vapour. See section 6 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The product is acceptable. See section 13 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		Use of the product satisfies the requirements of this Regulation. See section 13 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	3.2	Site preparation – protection from radon gas
Comment:		The product, including joints, can contribute to satisfying the requirements of this Standard, with reference to clause 3.2.2 ⁽¹⁾⁽²⁾ . See section 7.1 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The product is an effective barrier to liquid water and water vapour, with reference to clauses 3.4.1 ⁽¹⁾⁽²⁾ , 3.4.2 ⁽¹⁾⁽²⁾ , 3.4.5 ⁽¹⁾⁽²⁾ , 3.4.6 ⁽¹⁾⁽²⁾ and 3.4.7 ⁽¹⁾⁽²⁾ of this Standard. See section 6 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.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for 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)(iii)(b)(i)	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 13 and the <i>Installation</i> part of this Certificate.

Regulation:	26(1)(2)	Site preparation and resistance to contaminants
Comment:		The product, including joints, will enable a structure to satisfy the requirements of this Regulation. See section 7.1 of this Certificate.
Regulation:	28(a)	Resistance to moisture and weather
Comment:		The product is an effective barrier to liquid water and water vapour. See section 6 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 sections: 3 *Delivery and site handling* (3.1 and 3.4 to 3.7) and 14 *General* (14.1) of this Certificate.

Additional Information

NHBC Standards 2018

In the opinion of the BBA, COREFLEX XP, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Technical Requirement R3 and Chapters 5.1 *Substructure and ground bearing floors*, clause 5.1.20 *Damp-proofing concrete floors*, for use below the slab, and 5.4 *Waterproofing of basements and other below ground structures*.

Where Grade 2 or 3 protection is required and the below ground wall retains more than 600 mm (measured from the top of the retained ground to the lowest finished floor level), the product should be used in combination with either a Type B or C waterproofing protection.

CE marking

The Certificate holder has taken the responsibility of CE marking the product, in accordance with harmonised European Standards BS EN 13491 : 2004 and BS EN 13967 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 COREFLEX XP is a thermoplastic plasticised polyvinylchloride (PVC-P) membrane integrally bonded to an active XP Polymer Core geotextile layer to form a waterproofing membrane composite. The active XP Polymer Core is offset 150 mm from the PVC membrane layer along one long roll edge to allow thermoplastic membrane overlaps to be fused together on site using conventional hot-air welding techniques. Membrane overlaps should have a uniform minimum width of 100 mm for both the PVC layer and the active XP Polymer Core layer.

1.2 Ancillary items for use with the product and included in this assessment are:

- CoreFlash — 1.5 mm thick reinforced thermoplastic PVC-P membrane, designed for use as a flashing membrane in non-exposed service conditions
- CoreFlash UV — 1.5 mm thick reinforced UV stable thermoplastic PVC-P membrane, designed for use as a flashing membrane in exposed service conditions
- CoreFlash NR — 1.5 mm thick non-reinforced thermoplastic PVC-P membrane, designed for use as a flashing membrane
- Coretex XP — 2.3 mm thick XP Polymer Core waterproofing geotextile, designed for use as an accessory detailing product

- Universal Corner — 1.5 mm thick pre-formed non-reinforced PVC-P corner flashing detail, designed for use as a detailing product
- PF-150 — 1.5 mm thick pre-formed non-reinforced PVC-P detailing component, designed for sealing around penetrations up to 50 mm in diameter
- Adhesive SB-100 — solvent based flashing adhesive used for bonding CoreFlash membranes to vertical and horizontal substrates
- Waterstop XP (BBA Certificate 15/5278, Product Sheet 2) — a rectangular section, flexible, blue extruded strip of active expanding hydrophilic polymer/butyl rubber, with one side backed by a silicone release paper, available in coils 15 mm wide by 10 mm thick by 6 m long. The product is used as a water bar at reinforced concrete construction joints and around penetrations in underground concrete foundations and structures
- Seal X-XP — a trowel-grade mastic, for detailing use around penetrations, corner transitions and terminations
- Cetseal — single-component moisture curing polyether sealant/adhesive, designed for use as an adhesive for Coretex XP membrane overlaps, a detailing product used for sealing at termination details and around penetrations, and as an adhesive for Waterstop XP to prevent it from moving during the pouring and placement of concrete at construction joints and around penetrations
- Revo-Fix — steel mesh strips plus fixings, designed for use as an alternative mechanical fixing method for securing Waterstop XP to concrete construction joint surfaces
- Akwaswell — hydrophilic polyurethane caulk, used for detail work including pipe penetrations.

2 Manufacture

2.1 The product is manufactured in a controlled continuous process in which the hydrophilic polymer blend and adhesive are uniformly distributed between woven and non-woven geotextiles. The two geotextiles are interlocked by a needle punching process, which links the geotextiles and contains and confines the hydrophilic polymer blend. An additional PVC-P thermoplastic membrane is laminated to one side of the product.

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.

2.3 The management systems of the manufacturer have been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Quality & Reliability Polska (Certificate Q&R_503) and Kiwa (Certificate M 8749).

3 Delivery and site handling

3.1 The product is supplied in rolls 1.7 m wide by 12.9 m long, the PVC-P membrane is 1.55 m wide with the active XP Polymer Core geotextile offset by 150 mm along one long roll edge. The product is labelled with the product name, dimensions and product information, and delivered on pallets. The rolls, weighing 76 kg each, are packaged 16 units per pallet.

3.2 Ancillary items are packaged as shown in Table 1.

Table 1 Ancillary items — packaging

Component	Unit	Delivery packaging	Weight
CoreFlash	12.9 m x 1.55 m roll	20 rolls per pallet	42.5 kg per roll
CoreFlash UV	12.9 m x 1.55 m roll	20 rolls per pallet	42.5 kg per roll
CoreFlash NR	12.9 m x 1.55 m roll	20 rolls per pallet	40.0 kg per roll
Universal Corner	Injection moulded unit	20 per box	2.75 kg per box
PF-150	Injection moulded unit	20 per box	3.2 kg per box
Adhesive SB-100	Pail	60 pails per pallet	4.5 kg per pail
Akwaswell	310 ml cartridges	12 cartridges per box	6.8 kg per case
Waterstop XP	6 m coil	8 coils per box, 36 boxes per pallet	10.5 kg per box
Cetseal	290 ml cartridge	12 cartridges per box	5.4 kg per box
Coretex XP	1.55 m x 6.45 m roll	30 rolls per pallet	15.5 kg per roll
Seal-X XP	Pail	48 pails per pallet	15 kg per pail

3.3 Waterstop XP must be stored in dry conditions to prevent premature contact with water.

3.4 Seal-X XP must be stored at temperatures of between 16°C and 27°C, in a dry storage area away from sources of heat.

3.5 Adhesive SB-100 must be stored at temperatures of between 15°C and 35°C, in a dry storage area away from sources of heat and strong oxidisers.

3.6 Akwaswell must be stored at temperatures of between 5°C and 25°C, in a dry storage area away from sources of heat.

3.7 Protective clothing and eye protection must be worn, and eye and skin contact must be avoided for Seal-X XP, Adhesive SB-100 and Akwaswell.

3.8 The Certificate holder has taken the responsibility of classifying and labelling the product under the *CLP Regulation (EC) No 1272 / 2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant Safety Data Sheet(s).

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on COREFLEX XP.

Design Considerations

4 Use

4.1 COREFLEX XP is satisfactory for use as a fully bonded Type A waterproofing protection as defined in BS 8102 : 2009 for the waterproofing of new structures and as a damp-proofing membrane for solid floors in accordance with the relevant clauses of CP 102 : 1973, Section 3.

4.2 The product can be used externally on concrete to provide an effective barrier to the transmission of liquid water where Grades 1 to 3 waterproofing protection are required as defined in Table 2 of BS 8102 : 2009.

4.3 Where Grade 3 waterproofing protection is required, the environment must also be controlled by the use of ventilation, dehumidification and/or air conditioning (as appropriate) to ensure that dampness does not occur.

4.4 The product stops the passage of water between itself and the concrete structure to which it is fixed. The product must be adequately confined to ensure a watertight seal is achieved in service.

4.5 Waterstop XP (BBA Certificate 15/5278, Product Sheet 2) is satisfactory for use as a water bar in reinforced concrete construction joints, on Type B constructions as defined in BS 8102 : 2009. It is also used as an accessory in structures waterproofed with COREFLEX XP.

4.6 Waterstop XP is not designed for use in movement joints.

4.7 The product and components must never remain permanently exposed.

5 Practicability of installation

The product should only be installed by contractors who have been trained and approved by the Certificate holder.

6 Resistance to water and water vapour



The membrane, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture into the building.

7 Resistance to underground gases



7.1 The product will restrict the ingress of radon into buildings from naturally occurring sources.

7.2 Measured gas permeability/diffusion values on a plain and jointed membrane are given in Table 1.

Gas	Method	Result
Radon	K124/02-95	$6.1 \times 10^{-12} \text{ m}^2 \cdot \text{s}^{-1}$ (jointed)
		$5.3 \times 10^{-12} \text{ m}^2 \cdot \text{s}^{-1}$ (plain)

7.3 BRE Report BR 211 : 2015 recommends a 300 µm thick polyethylene sheet as the minimum required thickness for a gas-resistant membrane. It is generally accepted that other materials with comparable or higher gas resistance are suitable, provided they can withstand the construction process. In the opinion of the BBA, the product meets these criteria.

8 Resistance to mechanical damage

The membrane is robust and resistant to normal site activities. The dropping of heavy objects will normally have no damaging effect on the membrane. Any accidental cuts will self-heal when the membrane is hydrated following correct installation, provided that polymer material is not lost from the edges of the cut. If the damage is more extensive or material is lost from the membrane, it must be repaired (see section 16).

9 Chemical resistance

9.1 The gelling of the active XP Polymer Core is adversely affected by the presence of electrolytes (particularly trivalent ions) and may also be affected by the presence of soluble cations such as those found in chalk or lime soils. In these situations or in chemically contaminated areas, advice should be sought from the Certificate holder.

9.2 The membrane is not affected by organic contaminants.

10 Resistance to loading

Provided the product is adequately confined, properly hydrated and not subject to point loading, an installation beneath a foundation slab will transmit dead and imposed loads to the ground safely without excessive deformation. In situations where point loading is anticipated, the Certificate holder's advice should be sought.

11 Adhesion

When concrete is cast against the needle-punched geotextile core, the free ends of the needle-punched fibres become embedded in the concrete, creating a permanent bond between the concrete and membrane.

12 Maintenance

As the product is confined by the concrete and has suitable durability (see section 13), maintenance is not required. Any damage occurring during installation must be repaired in accordance with section 16.

13 Durability



COREFLEX XP, when fully protected and subjected to normal service conditions, will provide an effective barrier to the transmission of water and water vapour for the life of the structure in which it is incorporated.

Installation

14 General

14.1 COREFLEX XP may be applied under most normal site conditions, including sub-zero temperatures and during rainfall. Under wet conditions the product can withstand light construction traffic without significant extrusion of the polymer blend. Slight losses at the exposed edges of a lap joint will not impair the watertightness, provided the conditions given in section 14.6 are met. Any polymer blend that extrudes from the membrane will become slippery when wet which can have an adverse effect on site safety.

14.2 Waterstop XP must not be applied during heavy rainfall or where there is standing water.

14.3 COREFLEX XP can be cut using a sharp knife.

14.4 COREFLEX XP is installed with the active XP Polymer Core geotextile in contact with the concrete surface to be waterproofed.

14.5 The product bonds to poured concrete, forming an integral seal to prevent water migration and requires no priming, fillets or protection boards.

14.6 The formation of a continuous waterproof barrier is achieved using lap joints with a minimum overlap of 100 mm between adjoining edges and roll ends. All thermoplastic lap joints are secured with a continuous weld. COREFLEX XP (full length rolls or field cut dimensions as per project requirements) can be installed so that the roll ends are butted and trimmed as necessary to accommodate a single welding pass. Overlaps are formed by means of strips minimum 225 mm wide of CoreFlash (PVC-P component thermoplastic overlaps) and Coretex XP (active XP Polymer Core geotextile overlaps). Sequencing of the welding and placement of the CoreFlash and Coretex XP strips will depend on the orientation of the COREFLEX membrane. Refer to the manufacturer's installation guidelines as applicable for further guidance.

14.7 Sealing around small penetrations through the membrane, eg up to 50 mm diameter, is carried out by using thermoplastic PF-150 penetration flashings welded to a target patch of CoreFlash membrane, following the manufacturer's installation guidelines as applicable. For sealing around penetrations wider than 50 mm, eg at details as piles and service pipes, please refer to the manufacturer's installation guidelines as applicable for further guidance.

15 Procedure

COREFLEX XP – vertical surfaces

15.1 The product can either be installed against the outside of existing walls or applied to the inside face of shuttering to be subsequently filled with poured concrete.

15.2 Where COREFLEX XP is to be post-applied to cast concrete substrates, the product is aligned horizontally (although vertical alignment is possible) and fixed through the overlaps 25 mm from the membrane edge and outside of the weld line using proprietary washer-headed fasteners. When fixed to the inside face of shuttering, the product is aligned vertically (although horizontal alignment is possible) ensuring that all laps face down, away from the flow of the poured concrete. COREFLEX XP should be extended a minimum 300 mm above base slab finished level, with a minimum overlap of 100 mm achieved between the vertical membrane and the membrane protruding from the base slab. Please refer to the manufacturer's installation guidelines as applicable for further guidance.

15.3 Backfilling is carried out as soon as possible after placing the product. Backfill material must be free from builders' debris and angular aggregate, and compacted to a minimum 85% Modified Proctor density.

15.4 After backfilling, the application of the membrane is continued. The membrane must not be installed above the intended final ground level and is terminated on the concrete structure at ground level.

COREFLEX XP – horizontal surfaces

15.5 Substrates may be damp, but must be free from standing water. COREFLEX XP should be installed on to smooth concrete blinding with a float finish to provide a reasonably smooth, without sharp angular depressions, voids or raised features. If COREFLEX XP is to be applied to earth or sand substrates, they must be compacted to a minimum 85% Modified Proctor density. For installation over compacted earth or gravel substrates, consult manufacturer for additional steps required for the field fabrication of welded overlap seams.

15.6 At the edge of the slab the membrane must extend vertically a minimum of 300 mm above the top surface to form an overlap with the vertical membrane.

15.7 PVC-P layer overlaps must be welded and active XP Polymer Core geotextile overlaps/Coretex XP overlaps secured with CETSEAL to prevent displacement during concrete placement.

Installation of CoreFlash, CoreFlash NR and CoreFlash UV

15.8 Install CoreFlash and CoreFlash UV membrane with the black side orientated toward the concrete to be waterproofed securing it with Adhesive SB-100.

15.9 Install CoreFlash NR with either side toward the concrete to be waterproofed securing it with Adhesive SB-100.

15.10 Field seaming is accomplished by fusing the thermoplastic membrane with conventional welding equipment.

Installation of Coretex XP

15.11 Install Coretex XP as per detail requirements with all adjacent edges overlapped a minimum 100 mm and secured with Cetseal.

Installation of Seal-X XP

15.12 Apply Seal-X XP at a minimum 6 mm thickness unless otherwise noted on details or as directed by manufacturer. Seal-X XP should be applied when ambient and surface temperatures are -4°C and above.

15.13 Form 19 mm triangular corner fillets at slab/wall corner transitions or to vertical internal corners as applicable.

Installation of Waterstop XP

15.14 Joint surfaces must be clean, dry and free from cavities and spalling. Any irregularities in the surface do not normally need to be filled, but if necessary these can be filled with a suitable-strength cement grout or mortar while the concrete is still green, and made smooth.

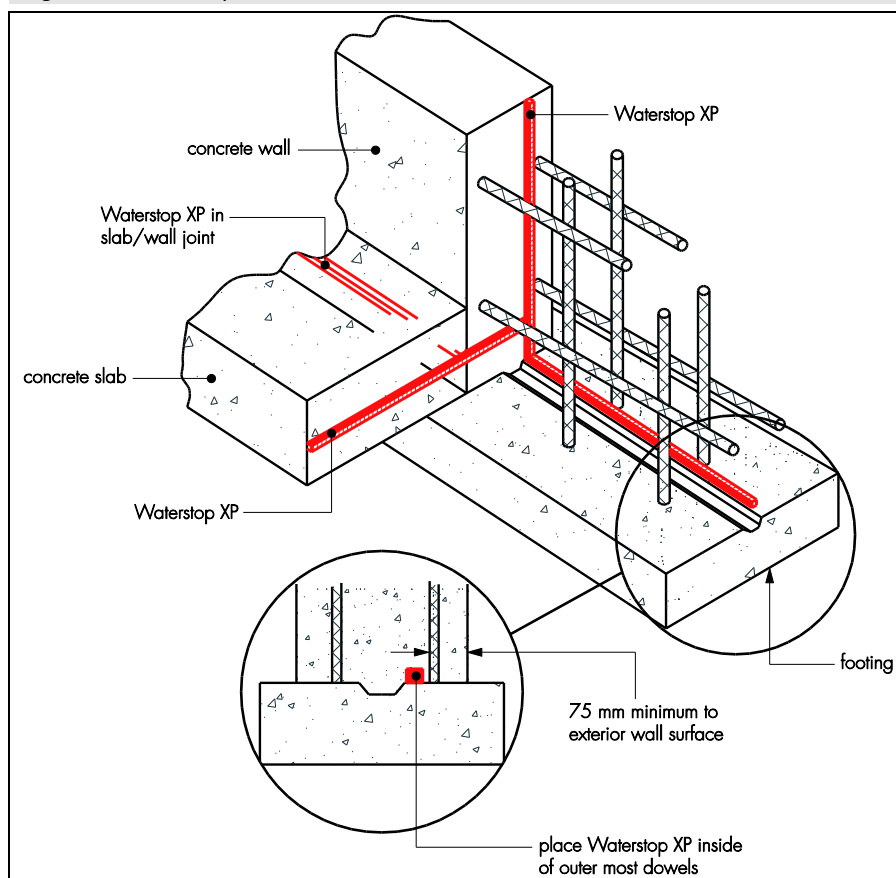
15.15 Waterstop XP is positioned in the centre of the reinforced concrete construction joint. It must be positioned in such a way as to ensure that a minimum of 75 mm concrete cover is provided to all sides of the waterstop.

15.16 The waterstop is installed around all through-wall pipes and mechanical penetrations, and around all structural elements such as steel columns penetrating the slab.

Fixing mesh method (for construction joints)

15.17 The release paper is removed, and lengths of Waterstop XP are placed so as to minimise coil end joints, ensuring that a minimum 75 mm depth of concrete will be maintained.

Figure 1 Waterstop XP installation details



15.18 Using a sharp knife or utility blade, coil ends are cut to fit tightly butted together, without overlapping, to form a continuous waterstop.

15.19 Revo-Fix strips are placed over the waterstop, and the strip-ends lapped by a maximum 25 mm. The lap is nailed through using the fixings supplied, and an additional fixing is installed 300 mm centre to centre along the Revo-Fix.

Adhesive method (for construction joints and service penetrations)

15.20 A continuous bead of Cetseal (typical bead diameter 6 mm) is applied to the dry, smooth concrete surface, ensuring that a minimum 75 mm depth of concrete will be maintained.

15.21 The release paper is removed, and lengths of Waterstop XP are placed so as to minimise roll end joints. The waterstop is pressed into the adhesive bead, so that the adhesive spreads to coat most of the bottom of the waterstop.

15.22 Using a sharp knife or utility blade, coil ends are cut to fit tightly butted together, without overlapping, to form a continuous waterstop.

Swelling

15.23 If the material exhibits considerable swelling prior to confinement in the joint, it must be replaced with new material.

Concrete casting

15.24 Casting of retaining walls and floor slabs is carried out immediately after fixing Waterstop XP in position.

Installation of Akwaswell

15.25 Clean the surface prior to application.

15.26 Apply a minimum 8 mm diameter bead continuously along the surface.

15.27 Place the Akwaswell where it will be covered by at least a minimum of 75 mm of concrete on all sides. Keep the nozzle tip pressed against the concrete at a 45° angle during application to assure continuous contact with the substrate. Typical application rate will be six linear metres per tube.

15.28 Install when the ambient temperature is above 4°C. Allow Akwaswell to cure for a minimum 24-36 hours before placing concrete.

16 Repair

16.1 The finished COREFLEX XP installation should be inspected, and any damaged material repaired prior to backfilling.

16.2 The damaged area must be clean and dry.

16.3 Install Coretex XP to cover the damaged area and extend it a minimum 100 mm beyond the damaged area. Secure Coretex XP with CETSEAL.

16.4 Install CoreFlash to cover all of the Coretex XP; extending a minimum 150 mm beyond the damaged area. Continuously weld the CoreFlash edge to the existing COREFLEX XP membrane in accordance with manufacturer's welding guidelines.

16.5 For CoreFlash repairs, use matching CoreFlash, CoreFlash UV or CoreFlash NR to seal damaged existing flashing membrane. Install CoreFlash to cover the damaged area and extend it a minimum 100 mm beyond the damaged area; continuously weld the CoreFlash edge to the existing CoreFlash membrane in accordance with manufacturer's welding guidelines.

Technical Investigations

17 Tests

17.1 Tests were conducted on COREFLEX XP and the results assessed to determine:

- ability to self-heal
- peel resistance of the joints before and after water soak
- shear resistance of the joints before and after water soak
- low temperature flexibility before and after heat ageing
- weight loss after heat age
- weight loss after water soak
- tensile properties before and after heat age.

17.2 Tests were conducted on CoreFlash and the results assessed to determine:

- width
- straightness and flatness
- thickness and mass per unit area
- tensile properties
- resistance to impact.

17.3 Tests were conducted on Adhesive SB-100 and the results assessed to determine:

- thermal-gravimetric analysis
- IR analysis
- Density
- tensile bond strength of CoreFlash to concrete and metal
- resistance to peel.

17.4 Tests were conducted on Akwaswell and the results assessed to determine:

- thermal-gravimetric analysis
- IR analysis
- Density
- skinning and cure time
- unrestrained swelling characteristics under alkali, neutral, saline and acidic conditions
- load developed when restrained
- resistance to hydrostatic water pressure.

18 Investigations

18.1 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.

18.2 An assessment was made of existing data for COREFLEX XP from independent laboratories relating to:

- length, width, straightness and flatness
- thickness and mass per unit area
- resistance to liquid water
- tensile properties
- resistance to impact
- resistance to root penetration
- resistance to static loading
- exposure to liquid chemicals including water
- resistance to tearing (nail shank)
- water vapour transmission properties
- dimensional stability
- radon diffusion including a welded joint.

18.3 Visits were made to sites in progress to assess the application properties of the product.

18.4 A survey of contractors was conducted to assess the practicability of application and the performance in use.

Bibliography

BRE Report BR 211 : 2015 *Radon : Guidance on protective measures for new buildings*

BS 8102 : 2009 *Code of practice for protection of below ground structures against water from the ground*

BS EN 13491 : 2004 *Geosynthetic barriers — Characteristics required for use as a fluid barrier in the construction of tunnels and underground structures*

BS EN 13967 : 2012 *Flexible sheets for waterproofing — Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet — Definitions and characteristics*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

CP 102 : 1973 *Code of practice for protection of buildings against water from the ground*

K124/02-95 *Radon diffusion coefficient by Czech Technical University to test number 124-11 – Measurement of radon coefficient*

19 Conditions

19.1 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 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.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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.