






Number BAB 18-077/02/A Replaces: -	  <h2 style="text-align: center;">BDA Agrément® BAB 18-077/02/A</h2> <p>Remark: in the text of this document reference is made to some of the sources in section 2 by adding the relevant reference number in superscript</p>	Category Below-ground structures
Date 2018-02-20		Phase Assessment
Project number 16-C-0416/2147		Subject Liquid applied waterproofing system
Validity www.kiwa.co.uk/bda		
Product	Visqueen Axiom UniSeal Waterproofing System 	
Agrément holder	Visqueen Building Products Heanor Gate Industrial Estate Heanor, Derbyshire DE75 7RG, UK T.: +44 (0) 333 202 6800 E.: enquiries@visqueen.com W.: www.visqueen.com	
Description	Two part multi-use liquid applied waterproofing membrane system (hereinafter the System). The System comprises a bitumen-extended polyurethane fluid and an accelerator hardener. The System cures rapidly giving a continuous tough rubber-like, waterproofing coating to provide a fully bonded Type A membrane when classified to BS 8102 ² . This contributes to provide waterproofing protection Grades 1 and 2; and Grade 3 when part of a combined waterproofing protection solution design.	
Scope (use)	Continuous trowel grade waterproofing system to below ground structures, ranging from domestic basements to large civil engineering projects in the following applications: fillet and reinforcement material at inside corners, detailing irregular profiles and pipe penetrations such as steel stanchions, externally waterproofing masonry and blockwork, sealing steel reinforcements and materials at terminations. The steel shall be C5 protected according to NHBC Standards Chapter 6.5. before the System is applied.	
Objective	This document provides independent information to specifiers, building control personnel, structural warranty providers, contractors, installers and other construction industry professionals with regard to the fitness for the intended use of the System.	
Summary of Agrément	This Agrément covers the following: <ul style="list-style-type: none"> • Conditions of use; • Sources, including relevant codes of practice and test reports; • Independently verified product characteristics; • Factory Production Control and continuous surveillance; • Points of attention for the specifier and specific details; • Installation procedure; • Compliance with Building Regulations and non-regulatory Standards. 	
Major points of assessment	<p>Water tightness aspects (section 3) An important property of the System concerns the water tightness. The System will resist the passage of water and any other form of moisture infiltration into the substrate, details and the building in accordance with BS 8102² Type A.</p> <p>Behaviour in relation to fire (section 6.5) The waterproofing of reinforced concrete earth retained structures using the System can be designed to meet the UK requirements, as described in section 6.5.</p> <p>Resistance to radon (sections 3, 6.4 & 6.6) The System is capable of restricting the ingress of radon when designed and installed according to section 6.4.</p> <p>Durability (section 6.7) The fully protected system will provide under normal service conditions a durable waterproof covering for the life of the building in which it is installed; the expected life time of the building itself should be at least 60 years.</p>	
Statement	<p>It is the opinion of the Kiwa BDA Expert Centre Building Envelope (ECBE) that the System is fit for its intended use, provided it is specified, installed and used in accordance with this Agrément.</p> <p>Professor Nico Hendriks, MSc  ECBE Chairman</p> <p>Authorisation: Chris van der Meijden, MSc  Kiwa BDA Technical Director</p>	
Version 02	<p style="text-align: center;">Kiwa BDA Expert Centre Building Envelope (ECBE)</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Kiwa BDA Avelingen West 33 P.O. Box 389 4200 AJ Gorinchem, The Netherlands +31 (0)183 66 96 90 </div> <div style="width: 45%;"> Kiwa Ltd. Unit 5 Prime Park Way Prime Enterprise Park Derby, DE1 3QB, United Kingdom +44 (0)7718 57 05 64 </div> </div> <p style="text-align: center;">Copyright © 2018 Kiwa BDA - www.kiwa.co.uk/bda</p>	
		Page 1 of 8 pages

<p>1 Conditions of use</p> <p>2 Sources</p>	<p>1 Application The application of the System relates to waterproofing of earth retained structures in the following applications: fillet and reinforcement material at inside corners, detailing irregular profiles and pipe penetrations such as steel stanchions, externally waterproofing masonry and blockwork, sealing steel reinforcements and materials at terminations. The System contributes to provide waterproofing protection Grades 1 and 2 and Grade 3 when part of a combined waterproofing protection solution design. The System shall not remain permanently exposed.</p> <p>2 Assessment The Czech University in Prague have assessed the System according to EN ISO/TS 11665-13¹²; Kiwa BDA Expert Centre Building Envelope (ECBE) has assessed all aspects related to the quality control, specifications, installation procedure and national Building Regulations.</p> <p>3 Installation The System shall only be installed by competent persons or contractors. The Agrément holder has a dedicated national training facility which is available on request. The System shall be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément.</p> <p>4 Geographical scope The validity of this document is limited to England, Wales, Scotland and Northern Ireland, with due regard to section 9. Regulations.</p> <p>5 Validity The purpose of this BDA Agrément® is to provide for well-founded confidence to apply the System in the described applications and according to approved specifications (see also section 8.4). According to the BDA Guideline - BDA Agrément®¹ the validity of this document is therefore three years after the official date of issue, published on www.kiwa.co.uk/bda. After this the validity can be extended every three years after positive review.</p> <p>1 BDA Guideline – BDA Agrément®, 2015-06-30 2 BS 8102:2009 Code of practice for protection of below ground structures against water from the ground 3 NHBC Standards 2018 Chapter 2.1 The Standards and Technical Requirements and Part 5 Substructure, ground floors, drainage and basements, Chapters 5.1 Substructure and ground bearing floors and 5.4 Waterproofing of basements and other below ground structures 4 BDA report 16-C-0416 / 16-C-0417– Site visit Visqueen Axiom Uniseal / Visqueen Axiom Guard, 2017-09-15 5 Technical Product Datasheet Part A and B Axiom UniSeal, identification no.VBP003, 2016-06-14 6 Safety Data Sheet Axiom UniSeal Part A, 2015-03-09 and Axiom UniSeal Part B, 2016-07-01 7 BS EN ISO 527-1:2012 Plastics – Determination of tensile properties – Part 1: General principles 8 BS EN ISO 527-3:2012 Plastics – Determination of tensile properties – Part 3: Test conditions for films and sheets 9 BS EN ISO 868:2003 Plastics and ebonite -- Determination of indentation hardness by means of a durometer (Shore hardness) 10 ETA – 10/0095 Liquid Applied Roof Waterproofing Kit, based on Polyurethane, 2010-04-17 11 Test Report No: 124029/2017 Radon diffusion coefficient of the AXIOM UNISEAL liquid waterproofing membrane carried out according to ISO/TS 11665-13, Czech Technical University in Prague – Faculty of Civil Engineering – Test Laboratory, 2017-08-22 12 ISO/TS 11665-13:2016 Measurement of radioactivity in the environment – Air: radon-222 – part 13: Determination of the diffusion coefficient in waterproof materials: membrane two-side activity concentration test method 13 Inspector’s Initial Factory Visit Report Form Visqueen Axiom Liquid Waterproofing System Visqueen Axiom Guard, Visqueen Axiom Uniseal, 2016-10-06 14 Vapour resistances and µ-values, BuildDesk publication to BS 5250: 2002 Annex E</p> <p>Remark: in the text of this document reference is made to some of these sources by adding the relevant reference number in superscript.</p>	
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<p>3 Independently verified system characteristics of components used for critical functions^{*)}</p>	<p>^{*)} The critical functions which apply to this Agrément are the behaviour in relation to fire (section 6.5), weatherproofing and durability (section 3).</p> <p>Axiom UniSeal</p> <ul style="list-style-type: none"> • identification properties - average thickness t : 2.5 mm • water vapour diffusion resistance factor, μ-value¹⁰ : 9,000 - • water vapour diffusion resistance BS EN 1931, s_D, calculated range from $s_D = t \cdot \mu$ (t in m)¹⁴ : 22.5 m • water vapour diffusion resistance, calculated range¹⁴ : 112.5 MNs.g⁻¹ • radon diffusion coefficient D¹¹ ISO/TS 11665-13¹² (t = 2.16) : 7.8 ± 0.7 10⁻¹¹m².s⁻¹ • tensile strength at break at 23 °C⁵ BS EN ISO 527⁸ : 4 N.mm⁻² • elongation at break at 23 °C⁵ BS EN ISO 527⁸ : ≥ 500 % • tack free time at 25 °C & 55% RH⁵ : 0.5 – 1 h • service temperature⁵ : -40 to 80 °C • hardness⁵ BS EN ISO 868⁹ : 25 Shore A 	
<p>4 Assessed associated products used for critical functions^{*)} ^{*)} See section 3</p>	<p>Protection materials in external tanking on masonry and blockwork</p> <ul style="list-style-type: none"> • Visqueen Protect&Drain (6, 12 or 15) • Visqueen Treadguard1500 <p>Other materials</p> <ul style="list-style-type: none"> • Visqueen Self Adhesive Membrane (SAM) – a tanking or damp proof membrane for both horizontal and vertical applications • Visqueen Gas Resistant Self Adhesive Membrane (GR SAM) - a tanking or damp proof membrane for both horizontal and vertical applications where bulk gases exist 	
<p>5 Factory Production Control (FPC), Quality Management System (QMS) and Continuous Surveillance</p>	<p>Kiwa N.V., Technical Assessment Body, represented by Kiwa Ltd. has determined that Visqueen Building Products, with respect to the System fulfills all provisions concerning the specifications described in this Agrément. The FPC audit conducted on 2016-09-13¹³ demonstrated that Visqueen Building Products operate an effective and well maintained Quality Management System (QMS). Based on information provided during the audit / site inspection a positive recommendation is given for FPC certification and a BDA Agrément[®] for the System.</p> <p>In order to demonstrate that the FPC is in conformity with the requirements of the technical specification described in this Agrément the continuous surveillance, assessment and approval of the FPC will be done in a frequency of not less than once per year by Kiwa Ltd.</p>	
<p>6 Points of attention for the specifier</p>	<p>1 Waterproofing design</p> <ul style="list-style-type: none"> - the System is designed for below-ground vertical and horizontal structures; - the design of the waterproofing of the earth retaining structure shall be in accordance with BS 8102²; - typical applications include backfilled concrete walls, structural slabs, inside corners, detailing irregular profiles and pipe penetrations such as steel stanchions, waterproofing masonry and blockwork externally and internally, sealing steel reinforcements and materials at terminations including timber; - the System satisfactorily contributes to provide waterproofing and damp proofing for Type A basement constructions to achieve protection Grades 1 and 2; and Grade 3 when part of a combined waterproofing protection solution design as defined in BS 8102²; - the construction should conform with current Building Regulations, British Standards, relevant Codes of Practice and NHBC Standards³, where necessary; - new concrete should be designed by a Structural Engineer to BS EN 1992 (Eurocode 2; formally BS 8110 & BS 8007) to be structurally capable for the intended use as an earth retained structure, resisting loading from earth as well as water pressure as recommended within BS 8102²; - where shuttering is to be removed to expose the outer face of the concrete walls, the System should be used to complete the work; - when installed in accordance with section 8 of this Agrément the System will provide for a durable resistance against the passage of water and any other form of moisture or vapour infiltration from the ground; - the System shall be protected prior to back-fill; suitable protection includes: <ul style="list-style-type: none"> • Suitable insulation • Visqueen Protect&Drain (6, 12 or 15) • Visqueen Treadguard1500 - the System and its components shall not remain permanently exposed. <p>2 Acceptable surfaces</p> <ul style="list-style-type: none"> - concrete walls - masonry walls - block walls <p>The fitness for purpose of the substrates shall be established according section 8.4 of this Agrément.</p>	
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6 Points of attention for the specifier
(continued)

3 Water tightness

- an important property of the System concerns the water tightness; the System will resist the passage of water and any other form of moisture or vapour infiltration from the ground;
- tests^{5,10} have shown that basement constructions waterproofed with the System when installed in accordance with section 8 of this Agrément meet or comply with the relevant requirements of the national Building Regulations of England and Wales, Scotland and Northern Ireland and NHBC Standards³, where necessary.

4 Protection from radon-contaminated land

- buildings in areas of risk from radon should be constructed in accordance with the recommendations of:
 - BRE Report 211: 2015 *Radon : Guidance on protective measures for new buildings*
 - BRE Report 212: 1991 *Construction of new building on gas-contaminated land*
 - BRE Report 376: 1999 *Radon : Guidance on protective measures for new buildings in Scotland*
 - BRE Report 413: 2001 *Radon : Guidance on protective measures for new buildings in Northern Ireland*
 - BRE Report 414: 2001 *Protective measures for housing on gas contaminated land*
 - CIRIA C735: 2014 *Good practice on the testing and verification of protection systems for buildings against hazardous ground gases*

5 Behaviour in relation to fire

- the System does not prejudice the fire-resistance properties of the building, the *waterproofed* structure being fully covered. Therefore, the components of the System will not contribute to the development stages of a fire or present a smoke or toxic hazard;
- when properly installed, the System will not add significantly to any existing fire hazard;
- the continuity of fire resistance must be maintained, for example as described in:
England and Wales - Approved Document B, Volume 1, Section 5; Scotland - Mandatory Standard, 2.1.15 (non-domestic) and clause 2.2.10 (domestic); Northern Ireland - Technical Booklet E, clause 4.20; the use of the System will not affect the fire rating obtained by concrete or block walls when evaluated by assessment to BS 476-3:2004.

6 Resistance to radon

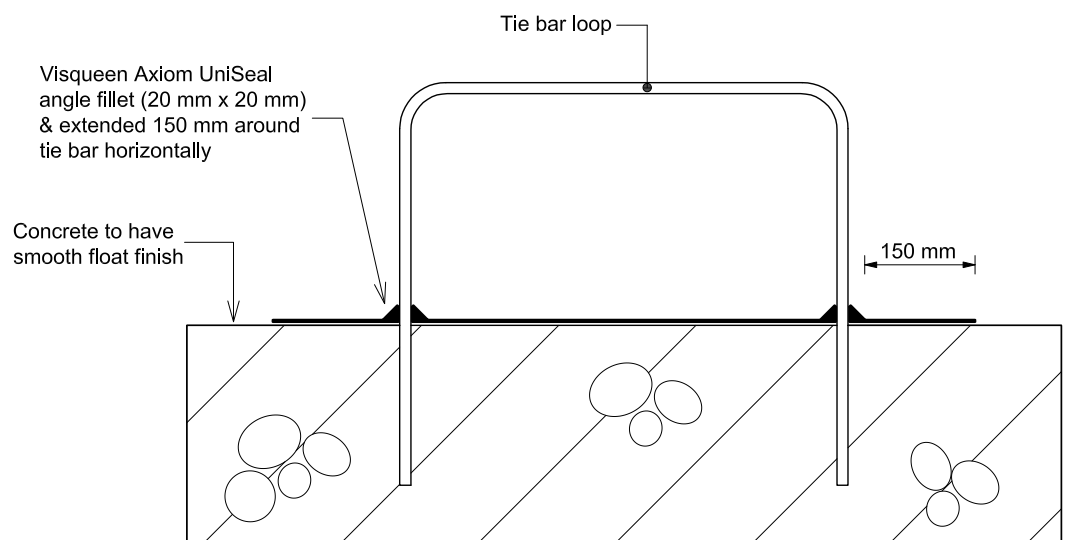
The System has been tested to determine the radon diffusion coefficient D^{11} . The results show (see section 3) that the System is capable of restricting the ingress of radon.

7 Durability

Under normal service conditions the fully protected System will provide a durable waterproof covering for the life of the building in which it is installed.

7 Specific details

Figure 1 - Typical detail for tie bar loop



7 Specific details
(continued)

Figure 2 - Typical detail wall tie

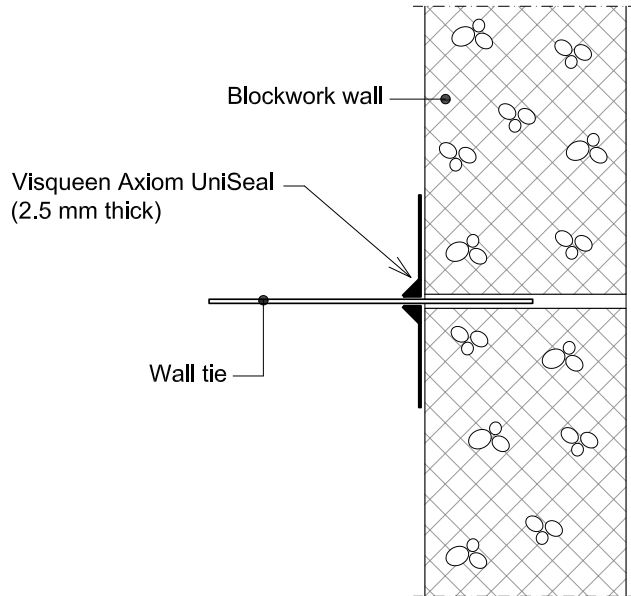


Figure 3 - Typical detail steel stanchion

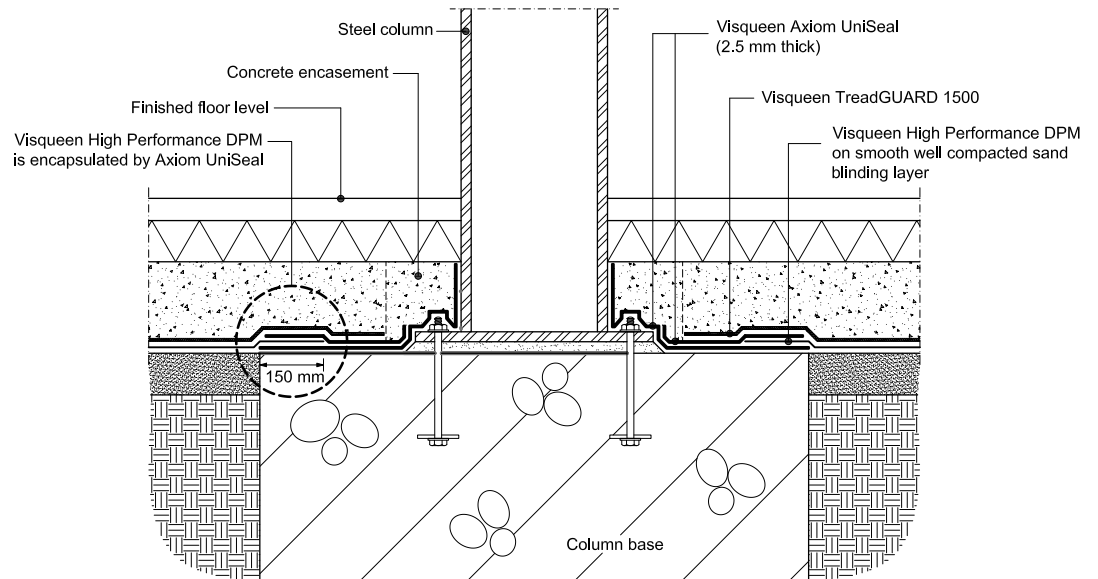
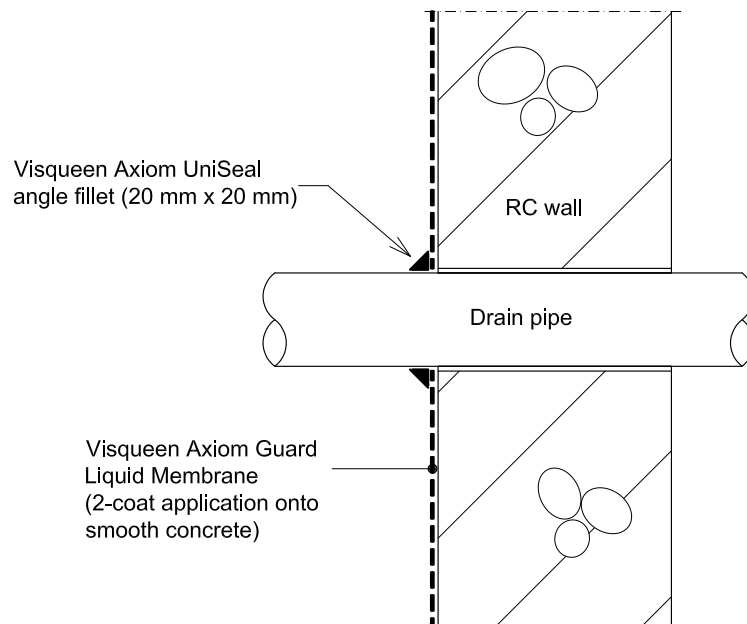


Figure 4 - Typical detail pipe penetration



7 Specific details
(continued)

Figure 5 - Typical detail blockwork

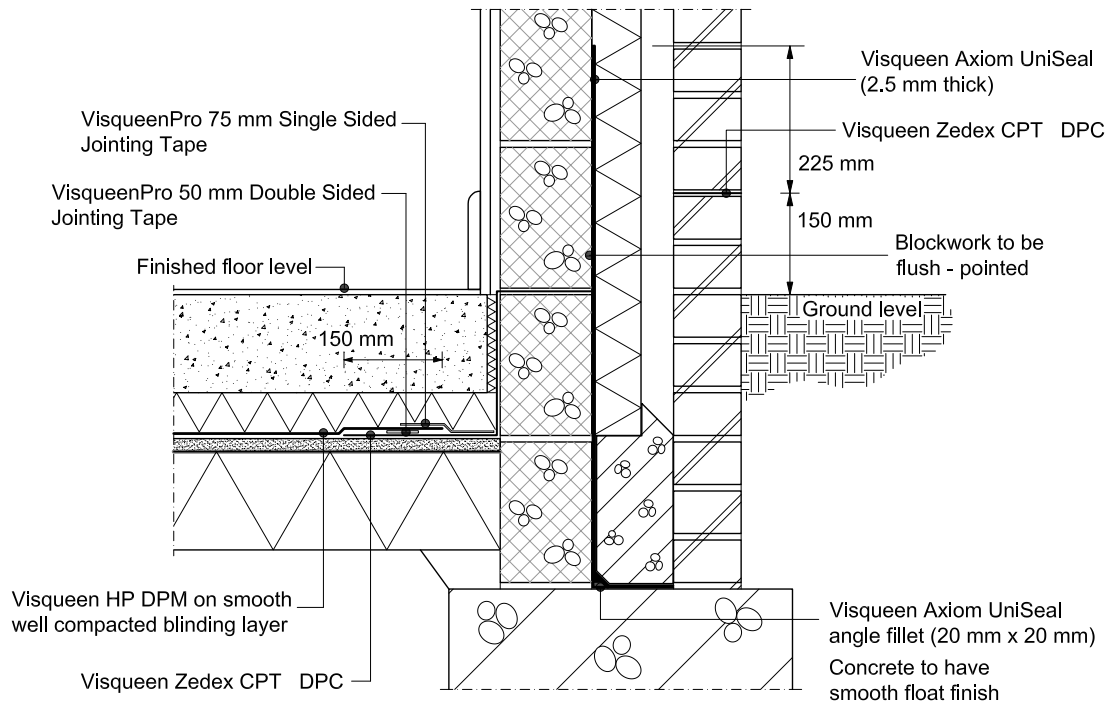
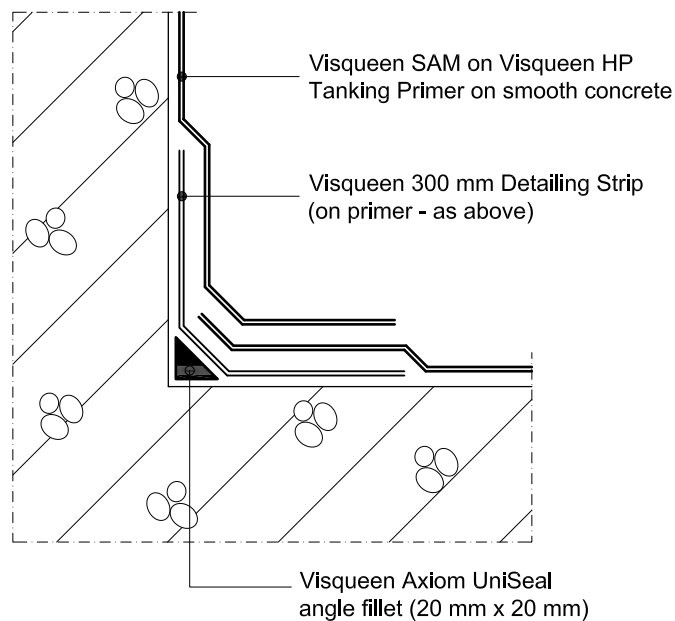


Figure 6 - Typical detail angle fillet detail



Remark 1: As part of the required technical consulting service (see section 8.5) the Agrément holder can provide, for special (CAD) details, for example connections, protrusions and materials at terminations.

Remark 2: The Agrément holder hosts regular training programmes at their training centre to provide contractors with the necessary skills and product knowledge.

8 Installation aspects

1 General

- the System shall be installed strictly in accordance with the instructions of the Agrément holder^{5,6} and the requirements of this Agrément and only by contractors whose employees have been trained and approved by the Agrément holder. The System can only be applied by trowel;
- special attention shall be given to the cleaning and preparing of all areas and connections involved before the System is installed, see sections 8.3 and 8.4.

<p>8 Installation aspects (continued)</p>	<p>2 Delivery and site handling</p> <ul style="list-style-type: none"> - the two part system is available in one 15.6 kg or 5.2 kg clamped tin containing: <ul style="list-style-type: none"> • Part A - 15 kg or 5 kg of bitumen-extended polyurethane liquid • Part B - 600 g or 200 g of the accelerator hardener - the label should include the System component name, the suppliers name, health and safety information, weight, the BDA identification mark, preparation and installation instructions and the number of this Agrément; it is recommended to read the Material Safety Data Sheets (MSDS)⁶ carefully prior to the opening of the tins; - the tins should be stored in clean, dry conditions, not exposed to sunlight, at temperatures between 5 °C and 25 °C; - the tins must be protected from being dropped or crushed by objects; care must be exercised when storing large quantities on site; - the components must not be exposed to open flame or other ignition sources and must be stored away from flammable material such as paint and solvents; - to ensure maximum performance of the components when installed, on site precautions must be taken to protect them from mud and dirt. <p>3 Axiom UniSeal</p> <ul style="list-style-type: none"> - all surfaces to be waterproofed shall be structurally stable, clean, dry and free from release agents, dust, laitance, oils, paints or other forms of contamination; - after cleaning and preparation of the substrate is complete, all surfaces shall be inspected for surface irregularities and suitable repairs made according to the installation instructions of the Agrément holder^{5,4}; - the System shall not be applied at an ambient temperature < 5 °C; - fillet applications shall be applied prior to the application of the self-adhesive membrane; - Mixing installation <ul style="list-style-type: none"> • the Parts A and B shall be mixed in a ratio 1 : 1; • a variable speed mixer with paddle is required; • the mixing shall be done strictly according to the Technical Data Sheet of the Agrément holder⁵; • once mixed the System shall be applied within 1 h at normal ambient temperatures; • once opened and mixed the liquid cannot be resealed and used again and shall be discarded appropriately; - touch dry should be achieved within 3 h; - Angle Fillet <ul style="list-style-type: none"> • in fillet applications the material should be at least 20 mm thickness in the horizontal and vertical surfaces; - Thicknesses <ul style="list-style-type: none"> • penetrations : ≥ 2.5 mm • full coverage : ≥ 2.5 mm • sealing steel reinforcements : ≥ 2.5 mm - External Tanking on Blockwork <ul style="list-style-type: none"> • the base structural slabs and the walls should be formed, and the vertical System should then be applied by trowel; • the membrane should then be protected from backfilling using Visqueen Protect&Drain (6, 12 or 15) or Visqueen Treadguard1500; - Internal Tanking on Blockwork <ul style="list-style-type: none"> • a loading coat concrete should be constructed immediately after the membrane has cured; • a 50 mm minimum cavity should be left between the membrane and the loading skin; • this cavity shall be filled with sand cement mortar fill as work proceeds. <p>4 Fitness for purpose of the substrate</p> <ul style="list-style-type: none"> - the application of the System is only allowed on a substrate fit for purpose; it is essential that the following specific performance requirements are met: <ul style="list-style-type: none"> • flatness in accordance with the relevant clauses of BS 8102²; • durable strength and stiffness of the structure which must be capable of absorbing all forms of external loadings as established by a Structural Engineer to BS EN 1991 (Eurocode 1); • durable adhesion and pre-treatment of the substrate in accordance with the relevant clauses of BS 8102²; - in cases where the fitness for purpose has not been demonstrated, installation of the System is not allowed within the framework of this Agrément. <p>5 Maintenance</p> <ul style="list-style-type: none"> - as the System is confined by concrete or protected by lost shuttering and earth or protected by specific measures and earth, maintenance is not required, provided that no part of the System remains permanently exposed; - the Agrément holder must continue to provide a technical consulting service, such as but not limited to special (CAD) details. 	
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<p>9 Building Regulations</p>	<p>1 Requirements: The Building Regulations 2010 and subsequent amendments</p> <ul style="list-style-type: none"> - A1 Loading – When adequately confined, the System contributes to satisfying this Requirement. See section 6 of this Agrément; - B4(1) External fire spread – the System does not prejudice the fire-resistance properties of the building, the waterproofed structure being fully covered; see section 6.5 of this Agrément; - C2(a) Resistance to moisture - tests for water tightness of the System indicate that the System meets this Requirement, see section 6.3 of this Agrément; - Regulation 7 Materials and workmanship – the System is manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance, see section 8 of this Agrément. <p>2 Requirements: The Building (Amendment) Regulations 2014 (Wales) and subsequent amendments</p> <ul style="list-style-type: none"> - A1 Loading – When adequately confined, the System contributes to satisfying this Requirement. See section 6 of this Agrément; - B4(1) External fire spread – the System does not prejudice the fire-resistance properties of the building, the waterproofed structure being fully covered; see section 6.5 of this Agrément; - C2(a) Resistance to moisture - tests for water tightness of the System indicate that the System meets this Requirement, see section 6.3 of this Agrément; - Regulation 7 Materials and workmanship – the System is manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance, see section 8 of this Agrément. <p>3 Requirements: The Building (Scotland) Regulations 2014 and subsequent amendments</p> <p>3.1 Regulations 8 (1)(2) Durability of materials and workmanship</p> <ul style="list-style-type: none"> - the System is manufactured from acceptable materials and are considered to be adequately resistant to deterioration and wear under normal service conditions, provided they are installed in accordance with the requirements of this Agrément, see section 8 of this Agrément. <p>3.2 Regulation 9 Building Standards-Construction</p> <ul style="list-style-type: none"> - 1.1 (a)(b) Structure – The application of the System will not adversely affect the building's ability to transmit loadings; - 2.8 Spread from neighbouring buildings - under normal circumstances the use of the System is unrestricted under this Requirement; see section 6.5 of this Agrément; - 3.4 – Moisture from the ground - The System will resist the passage of water and any other form of moisture infiltration from the ground, see section 6.3 of this Agrément. <p>3.3 Regulation 12 Building Standards-Conversions</p> <p>All comments given for the System under Regulation 9 also apply to this Regulation, with reference to clause 0.12 and Schedule 6 of this Standard.</p> <p>4 Requirements: The Building Regulations 2012 (Northern Ireland) and subsequent amendments</p> <ul style="list-style-type: none"> - 23(a)(i)(ii)(iii)(b) Fitness of materials and workmanship – The System is manufactured from materials which are considered to be suitably safe and acceptable for use as waterproofing as described in section 8 of this Agrément; - 28(a) – Resistance to ground moisture - the System will resist the passage of water and any other form of moisture or vapour infiltration from the ground, see section 6.3 of this Agrément; - 30 Stability – Being adequately confined and protected, the System contributes to satisfying this Requirement, see section 6 of this Agrément; - 36(a) External fire spread – the System does not prejudice the fire-resistance properties of the building, the waterproofed structure being fully covered; see section 6.5 of this Agrément. <p>5 The Construction (Design and Management) Regulations 2015 The Construction (Design and Management) Regulations (Northern Ireland) 2016</p> <p>Information in this Agrément may assist the Principal, the Construction Design and Management coordinator, specifiers and contractors to address their obligations under these Regulations, see section 3 of this Agrément.</p>	
<p>10 NHBC Standards</p>	<p>In the opinion of Kiwa BDA, the Visqueen Axiom UniSeal Waterproofing System, if installed, used and maintained in accordance with this Agrément, can satisfy or contribute to satisfying the relevant requirements in relation to NHBC Standards, Chapters 5.1 Substructure and ground bearing floors and 5.4 Waterproofing of basements and other below ground structures³.</p>	
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