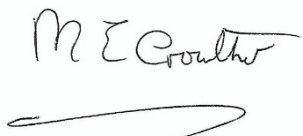


Number BAR-19-105-S-A-UK Replaces: -	 	Category New build and retrofit existing flat roofs
Date September 2019	BDA Agrément® BAR-19-105-S-A-UK	Phase Assessment
Project number 3047		Subject Liquid applied waterproofing system
Validity www.kiwa.co.uk/bda		
System Agrément holder	Silikal WP321 Waterproof System Silikal GmbH Ostring 23 63533 Mainhausen Germany T.: +49618292350 E.: info@silikal.de W.: www.silikal.com	 Expect more from your floor.
Description	Cold liquid applied (by roller or brush) one to three coat system (hereinafter the "System") requiring a primer, with strips of glass fleece reinforcement at details and overlaps in the substrate. The System sets within 20 minutes of mixing and is trafficable within 1 hour. Available in a variety of colours.	
Scope (use)	Waterproofing of newly built flat roof constructions and over coating of existing flat roof surfaces (see section 8.2) including but not limited to single ply, asphalt, concrete, bitumen roofing felt, thermal insulation, timber and existing pitched roof surfaces of metal or asbestos.	
Summary of Agrément	This Agrément covers the following: • Conditions of use; • Sources, including relevant codes of practice and test reports; • Independently verified product characteristics; • Quality control and continuous surveillance; • Points of attention for the specifier and examples of details; • Installation procedure; • Compliance with national Building Regulations and non-regulatory Standards.	
Major points of assessment	Strength (sections 3, 8.1 and 8.2) Tests for delamination and static and dynamic indentation show the unprotected System will resist limited foot traffic and loads possible during installation and maintenance of the System. Moisture control (sections 8.3 and 8.5) The System will resist the passage of water when subjected to static and dynamic indentation and to fatigue. The risk of interstitial condensation is specific for each project. Detachment risk (section 8.4) The System will sufficiently resist the effects of any likely wind up-lift forces and the effects of thermal or other minor movements of the substrate likely to occur in practice. Fire performance (section 8.6) The System can be used in a construction designed to meet the UK requirements. Durability and maintenance (section 8.7) The unprotected System will provide under normal service conditions a durable waterproof covering with a service life expectancy of at least 20 years.	
Statement	It is the opinion of Kiwa Ltd. that the System is fit for its intended use, provided it is specified, installed and used in accordance with this Agrément.  Chris Vurley, CEng Technical Manager, Building Products  Mark Crowther, M.A. (Oxon) Technical Director	
Version 01	Kiwa Ltd. Unit 5 Prime Park Way, Prime Enterprise Park Derby, DE1 3QB, United Kingdom +44 (0)1332 383333 © 2019 Kiwa Ltd.	Page 1 of 8 pages

1 Conditions of use	1 Application The assessment the System relates to its use for new build and retrofit existing flat roofs of dwellings and buildings with similar temperature and humidity conditions with correctly installed continuously supported coverings, which have been designed and constructed in accordance with, but not limited to, the relevant clauses of BS 6229 and BS 8217 or any other structurally sound substrates. The products used for the System are not classified as dangerous according to EU directive 199/45/EC. 2 Assessment Kiwa BDA Testing^{*)} has assessed the System according to the principles of ETAG 005:2004; a summary of the test results is given in section 3 of this Agrément. Kiwa Ltd. has assessed all aspects related to the quality control, specifications, installation procedure and Building Regulations. ^{*)} <i>Notified Laboratory Nr. NB 1640</i> 3 Installation The System shall only be installed by contractors whose employees have followed a training programme which provides contractors with the necessary skills and product knowledge to become a fully certified Silikal WP321 Approved Contractor. The System shall be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément. 4 Geographical scope The validity of this document is limited to England, Wales, Scotland and Northern Ireland, with due regard to section 11 (Building Regulations) of this Agrément. 5 Validity The purpose of this BDA Agrément[®] is to provide for well-founded confidence to apply the System for the applications (see also section 8.2) according to an approved installation (see also section 10). According to the BDA Guideline – BDA Agrément[®] 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. This Agrément is not valid in those cases where Kiwa identifies that the design of the application does not comply with section 8.2 (Permitted constructions) of this Agrément.	
2 Sources	1 BDA Guideline – BDA Agrément[®], 2015-06-30. 2 BS 6229:2018 Flat roofs with continuously supported flexible waterproof coverings – Code of practice. 3 BS 8217:2005 Reinforced bitumen membranes for roofing – code of practice. 4 ETAG 005:2004, parts 1, 2 and 7 Guideline for European Technical Approval of Liquid Applied Roof Waterproofing Kits. 5 Kiwa BDA Testing, test report No. 0262-C-16/1, determination of product characteristics, 2018-03-13. 6 Kiwa BDA Testing, test report No. 0309-C-18/1, reaction to fire – ignitability System, 2018-12-19. 7 Kiwa BDA Testing, classification report No. 0309-C-18/2, fire class of System, 2018-12-19. 8 Silikal WP321 Quick Reference Guide, issue: 12/08/2019 – V1. 9 Silikal WP321 Felt Specification, version REV:2-22/07/19. 10 Silikal WP321 MMA Chemical Resistance Guide, revised on 22/07/2019. 11 Kiwa GmbH Polymer Institut, FPC certificate No. 1119-CPR-0831 (in German), 08.01.2019. 12 BS EN 1504-2:2004. Products and systems for the protection and repair of concrete structures - Definitions, requirements, quality control and evaluation of conformity - Part 2: Surface protection systems for concrete. 13 TÜV PROFiCERT, certificate ISO 9001:2015 No. 73 100 663, issued in 2018. 14 Silikal WP321 Installation Guide, issue date: 2019-1. 15 Exova Warrington, test report No. 385507: External Fire Exposure Test, 2017-07-05. 16 BS 476-3:2004 Fire tests on building materials and structures. Classification and method of test for external fire exposure to roofs. 17 BS 5250:2011+A1:2016 Code of practice for control of condensation in buildings. 18 BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests. 19 EOTA, Technical report No. TR 007:2004 - Determination of the resistance to static indentation. 20 BS EN 12691:2018 Flexible sheets for waterproofing. Bitumen, plastic and rubber sheets for roof waterproofing. Determination of resistance to impact. 21 BS EN 1297:2004 Flexible sheets for roofing. Bitumen, plastic and rubber sheets for roof waterproofing. Method of artificial ageing by long term exposure to the combination of UV radiation, elevated temperature and water. 22 EOTA, Technical report No. TR 008:2004 – Determination of the resistance to fatigue movement. 23 EOTA, Technical report No. TR 004:2004 – Determination of the resistance to delamination. 24 BS EN 1607:2013 Thermal insulating products for building applications. Determination of tensile strength perpendicular to faces. 25 Kiwa BDA, test report 13-B-0953/4, Installation of System, 2018-08-14.	
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3 Independently verified system characteristics of components used for critical functions**)	Silikal WP321																																																	
	**) The critical functions which apply to this section and section 4 are the behaviour in relation to fire, weatherproofing and durability.																																																	
	- identification properties - minimum application thickness for waterproofing - minimum tensile strength - elongation at break - reaction to fire, Euroclass (BS EN 13501-1) - resistance to external fire exposure - category (BS 476: Part 3) - water vapour resistance (tabulated value) - water vapour resistance factor (μ-value) - vapour diffusion-equivalent air layer thickness (S_d) - resistance to static indentation (EOTA TR 007) (concrete substrate with load of 150 N) - initial - after ageing (60 days in water of 60 °C) - resistance to dynamic indentation (hard support) BS EN 12691 (method A): - initial, drop height of 900 mm - after ageing (4000 h of UV, BS EN 1297) drop height of 1500 mm - resistance to dynamic indentation (soft support) BS EN 12691 (method B): - initial, drop height of 1250 mm - after ageing (4000 h of UV, BS EN 1297) drop height of 1250 mm - resistance to fatigue movement (EOTA TR 008) after 1,000 cycles at -10 °C - resistance to delamination (EOTA TR 004) initial and after ageing (7 days @ 70 °C/90% RH)																																																	
	<table><tr><td>concrete, mean value,</td><td>initial</td><td>: 1619</td><td>kPa</td></tr><tr><td></td><td>after ageing</td><td>: 1037</td><td>kPa</td></tr><tr><td>felt, mean value,</td><td>initial</td><td>: 255</td><td>kPa</td></tr><tr><td></td><td>after ageing</td><td>: 830</td><td>kPa</td></tr><tr><td>OSB, mean value,</td><td>initial</td><td>: 623</td><td>kPa</td></tr><tr><td></td><td>after ageing</td><td>: 337</td><td>kPa</td></tr><tr><td>PVC, mean value,</td><td>initial</td><td>: 1137</td><td>kPa</td></tr><tr><td></td><td>after ageing</td><td>: 1203</td><td>kPa</td></tr><tr><td>metal tiles, mean value,</td><td>initial</td><td>: 2033</td><td>kPa</td></tr><tr><td></td><td>after ageing</td><td>: 963</td><td>kPa</td></tr><tr><td>APP, mean value,</td><td>initial</td><td>: 283</td><td>kPa</td></tr><tr><td></td><td>after ageing</td><td>: 320</td><td>kPa</td></tr></table>	concrete, mean value,	initial	: 1619	kPa		after ageing	: 1037	kPa	felt, mean value,	initial	: 255	kPa		after ageing	: 830	kPa	OSB, mean value,	initial	: 623	kPa		after ageing	: 337	kPa	PVC, mean value,	initial	: 1137	kPa		after ageing	: 1203	kPa	metal tiles, mean value,	initial	: 2033	kPa		after ageing	: 963	kPa	APP, mean value,	initial	: 283	kPa		after ageing	: 320	kPa	
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	after ageing	: 320	kPa																																															
	- installation temperature - pot life (20 °C / 10 °C) - storage temperature	: 0 to +35 : 15 / 20 minutes : +5 to +20	°C °C																																															
4 Non-assessed ancillary items used for critical functions**)	- Joint Tape: PP reinforcement matting with a mass of 100 g·m⁻², available in various widths and lengths; used to reinforce the Silikal WP321 Waterproof membrane; also assists in regulating the correct thickness of application. - Silikal WP321 Crack and Joint filler: three-part trowelable filling system comprising of aggregate, liquid base and catalyst. - Silikal WP321 Ponding filler kit: two-part system to level the surface and fill holes or cracks. - Anti-Skid: two-part anti-slip finish system comprising aggregate liquid mix and a base catalyst.																																																	
5 Factory Production Control (FPC)	Kiwa GmbH Polymer Institut, Notified Body No. 1119, has performed the initial inspection of the factory and of the Factory Production Control (FPC) and performs the continuous surveillance and FPC. Certificate No. 1119-CPR-0831 attests that factory production control (FPC) is satisfactory to meet System 2+ of the CPR for the relevant properties as described in Annex ZA of BS EN 1504-2.																																																	
6 Quality Management System	The System components are produced under a Quality Management System (based on the FPC certificate and the ISO 9001 certificate), which enables the Agrément holder to demonstrate that the components fulfil the requirements of this Agrément.																																																	
7 Continuous surveillance	The FPC certificate of Factory Production Control No. 1119-CPR-0831 remains valid subject to satisfactory surveillance audits and the conditions in the factory or the requirements in the harmonised standard are not modified significantly.																																																	
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8 Points of attention for the specifier	1 Roof design - within the geographical scope (see section 1.4) the System will be appropriate in practically all cases; in cases where unusually high surface temperatures (> 40 °C) occur for relatively long periods (> 4 weeks) advice should be sought from the Agrément holder; - the roof construction shall conform with current Building Regulations, British Standards and relevant Codes of Practice; - the access to the roof shall be limited, meaning roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc.; - the minimum finished fall of a flat roof surface shall be 1 : 80; - the roof type and existing roof covering shall be acceptable according to section 8.2 of this Agrément; - the substrate for the System shall be designed, constructed and prepared in accordance with the relevant clauses of BS 6229 and BS 8217; - the System can be applied either without or with a finish of mineral granules. 2 Permitted constructions The following roof types and roof coverings are permitted to be waterproofed with the System (see also the diagrams in section 9) in accordance with this Agrément, with due respect to section 8.1: Roof types: - warm exposed flat roofs; - cold exposed pitched metal roofs with a maximum pitch; - inverted roof build-ups with aggregate or paver ballast on flat roofs. Note: green roof applications have not been assessed. Roof coverings (see also section 3): - concrete; - bitumen roofing felt; - OSB board; - single ply (PVC); - metal tiles; - APP modified bitumen. The fitness for purpose of the substrates shall be established according to section 10.3 of this Agrément. 3 Watertightness The System is watertight when subjected to a water pressure difference of 15 kPa after dynamic indentation and when subjected to sparks after resistance to fatigue and static indentation (see section 3). When installed in accordance with section 10 of this Agrément the System will resist the passage of water and any other form of moisture infiltration into the roof. 4 Detachment risk - tests have shown that the System will sufficiently resist the effects of wind up-lift forces; - when installed in accordance with section 10 of this Agrément the System will provide a waterproof roof sufficiently resisting the effects of thermal or other minor movements of the substrate likely to occur in practice. 5 Condensation risk Roofs incorporating the System will adequately limit the risk of interstitial condensation when designed in accordance with BS 5250. 6 Fire performance - the System does not prejudice the fire-resistance properties of the roof. 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 reaction to fire has been classified as Euroclass E according to BS EN 13501-1; the resistance to external fire exposure has been categorized as EXT. F. AC according to BS 476 Part 3. 7 Durability and maintenance The System is stable, rot-proof and will provide under normal service conditions a durable waterproof covering with a service life of at least 20 years. There is no risk for moth or beetle infestation.	
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Diagram 1 – Typical build-up of flat roof application of the System in combination with Anti-Skid

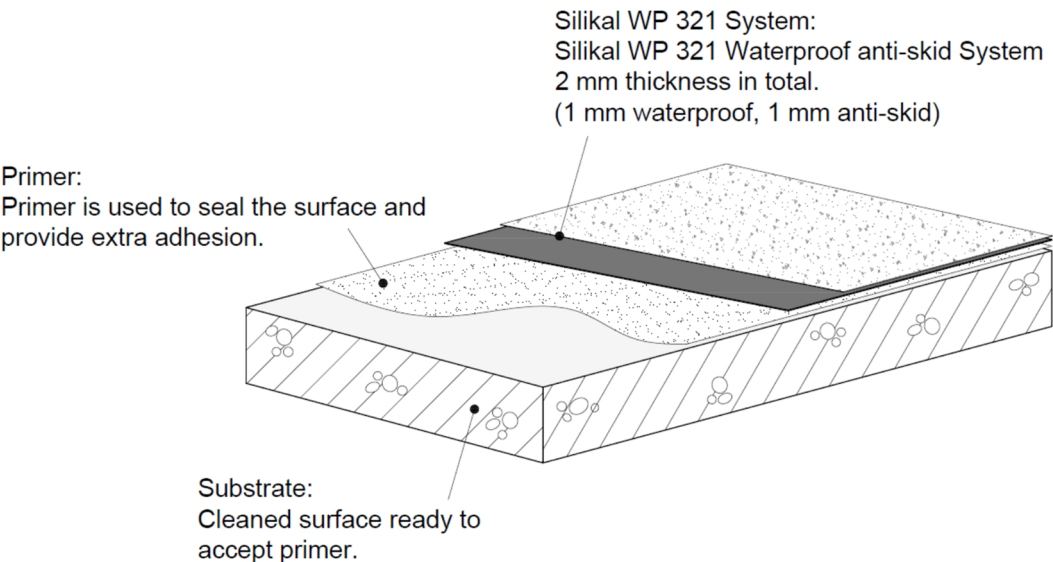


Diagram 2 – Detailing Cracks and Joints

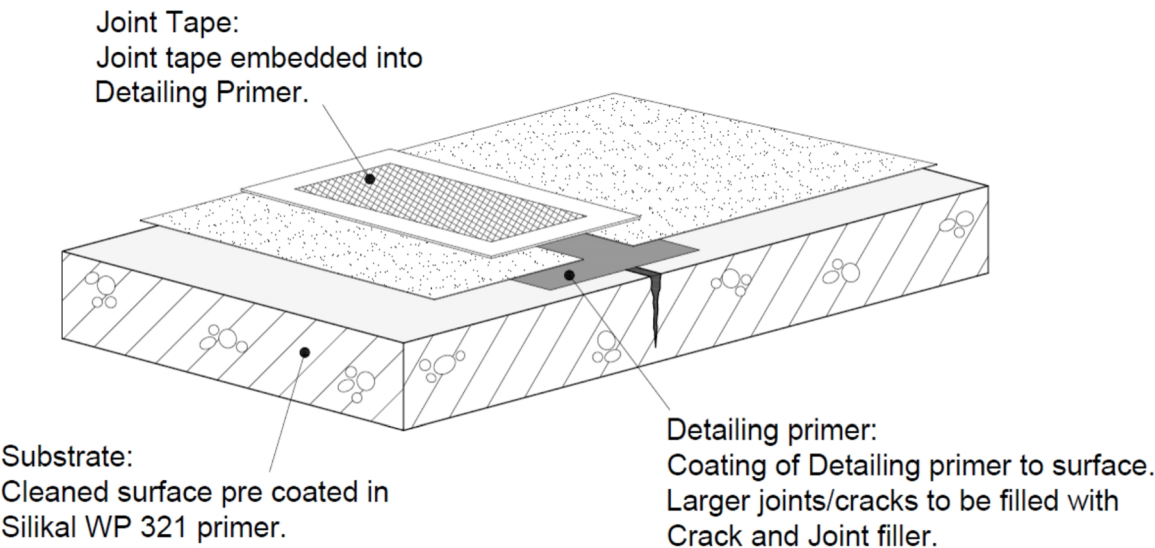
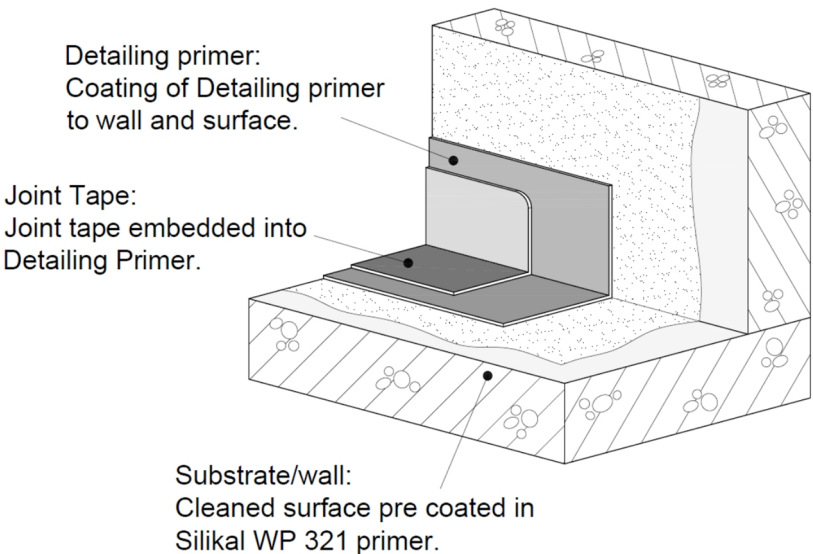


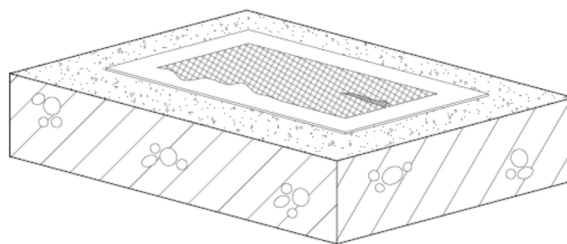
Diagram 3 – Detailing Angles



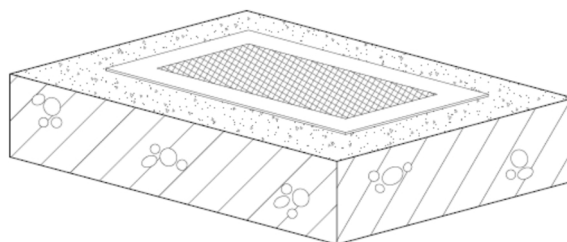
9 Examples of details
(continued)

Diagram 4 – Joint Tape Application

Ensure when applying Joint Tape that it is completely flat and free of gaps or fish mouths.



The perfect finish for Joint Tape leaves it flat to the surface and free of gaps fully embedded into the Detailing Primer below



Remark 1: As part of the required technical consulting service the Agrément holder can provide special (CAD) details, for example on openings, outlets and gutters.

Remark 2: Silikal hosts regular training programmes to provide contractors with the necessary skills and product knowledge to become a fully certified Silikal WP321 Approved Contractor

10 Installation aspects

1 General

- the System shall be installed strictly in accordance with the instructions of the Agrément holder and the requirements of this Agrément and only by contractors whose employees have been trained and approved by the Agrément holder;
- installation of the System and ancillary items shall be in accordance with the Agrément holder's specifications and current good building practice;
- cracks, substrate damage and deterioration shall be repaired prior to installation of the System in accordance with the relevant clauses of BS 6229 and BS 8217;
- 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 (such as cracks, blisters and plies) and suitable repairs made according to section 9, diagram 2 and the installation instructions of the Agrément holder;
- the System shall not be applied at an ambient temperature below 0 °C.

2 Delivery and site handling

- the components of the System are delivered to site in protective containers; the label should include product component name, the suppliers name, health and safety information, weight, the BDA Agrément® identification mark, preparation and installation instructions and the number of this Agrément; it is recommended to read the Material Safety Data Sheets (MSDS) carefully prior to the opening of the containers;
- the containers should be stored in clean, dry conditions, not exposed to sunlight; the containers must be protected from being dropped or crushed by objects; care must be exercised when storing large quantities on site;
- the containers must not be exposed to open flame or other ignition sources and 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.

10 Installation aspects (continued)	3 Fitness for purpose of the substrate - the substrate must be assessed to establish it is fit for purpose; it is recommended to perform a pulling test according to BS EN 1607 on the adhesion, the tensile strength perpendicular to the roof surface shall be at least 4 kPa; - 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: - o flatness in accordance with the relevant clauses of BS 6229 and BS 8217. - o durable strength of the structure, which must be capable of absorbing all forms of external loadings as established by the Structural Engineer to BS EN 1991. - o stiffness, durable adhesion and pre-treatment of the substrate in accordance with the relevant clauses of BS 6229 and BS 8217. - in case the fitness for purpose has not been demonstrated, installation of the System is not allowed within the framework of this Agrément. 4 Mixing - it is recommended that all products are mixed using a paddle mixer where available, or with similar apparatus; - ensure all products are mixed thoroughly to ensure even curing; typically 1 minute of mixing is sufficient; Primers, waterproof and Anti-Skid - all primer, waterproof and anti-skid products in the Silikal WP321 range are two parts: base product and catalyst; Curing time - once catalysed (catalyst mixed into base product) the installer will have up to 20 minutes in which to apply the product to the required area or application; - it is advised to always decant only the amount of product that can be applied within 10 minutes to avoid unnecessary wastage and avoid shortage of product; for further details see the Agrément holder's instructions. 5 Roof installation Priming - on completion of the cleaning and preparation, proceed with coating the whole roof with Silikal WP321 Detailing Primer from the product range at a typical coverage of 0.3 kg·m⁻² (this may vary depending on the substrate); - use a brush or roller to apply to all areas required to be waterproofed including upstands. Waterproofing - it is recommended to start with the detailing; guidance is given in the diagrams 2, 3 and 4 of section 9 and in the Silikal WP321 Installation Guide; - mix the base product with catalyst according to the recommendations in the part Mixing Guide of the Installation Guide; - after application of the primer layer allow a 1-hour interval before applying the first coat (waterproofing layer), to ensure the primer is fully cured; - once mixed decant the amount that can be applied in 10 minutes and coat evenly using brush or roller; the coverage is 1.25 kg·m⁻² for the first (embedment) coat and 0.75 kg·m⁻² for the second (top) coat; allow a 1-hour interval between application of the first and second coat; - if not applying Anti-Skid one can proceed to apply any trims or carry out any additional works required; - if applying an Anti-Skid coating to the waterproofing membrane, ensure the area to be coated is free of any dust or dirt. Anti-Skid - apply masking tape when a neat finish/edge is required between areas with and without Anti-Skid; - once mixed, decant the amount required and apply using brush or roller; the coverage is 1 kg·m⁻² to ensure the aggregate stands proud of the liquid and provides a rough finish to the surface; - while curing, remove the tape to ensure a clean edge to the walkway; allow a 1-hour interval before allowing traffic onto the cured surface. 6 Maintenance and repair - once installed strictly in accordance with the requirements of this Agrément and of the Agrément holder, the applied System only requires normal maintenance, comparable with the maintenance as required for single-ply and bitumen felt roof surfaces; - the System should be subjected to regular annual inspections by a competent approved contractor and roof drains and gutters kept clear as is good practice; - if during the inspection any damage e.g. in the form of cracks or 'fish-mouths' is observed, these areas shall be repaired (preferably during the inspection) using the same method as given in the specifications of the Agrément holder and illustrated in diagram 2 of section 9 of this Agrément; - the Agrément holder can provide a technical consulting service, such as (but not limited to) special (CAD) details.	
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11 Building Regulations	1 England - Requirements: The Building Regulations 2010 and subsequent amendments - B4(2) External fire spread – tests indicate that on suitable substructures the use of the System will enable a roof to be unrestricted under this Requirement; the System has fire class E and classification EXT. F. AC; - C2(b) Resistance to moisture - tests for water tightness of the System, including joints, indicate that the System meets this Requirement; - Regulation 7 Materials and workmanship – the System components are manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance. 2 Wales - Requirements: The Building Regulations 2010 and subsequent amendments - B4(2) External fire spread – tests indicate that on suitable substructures the use of the System will enable a roof to be unrestricted under this Requirement; the System has fire class E and classification EXT. F. AC; - C2(b) Resistance to moisture - tests for water tightness of the System, including joints, indicate that the System meets this Requirement; - Regulation 7 Materials and workmanship – the System components are manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance. 3 Requirements: The Building (Scotland) Regulations 2004 and subsequent amendments 3.1 Regulations 8 (1)(2): Durability of materials and workmanship The System is manufactured from acceptable materials which 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 10 of this Agrément. 3.2 Regulation 9: Building Standards – Construction - 2.8 Spread from neighbouring buildings – tests indicate that the System when applied to a non-combustible substrate, can be assessed as having low vulnerability under clause 2.8.1 of this Standard, the System has Euroclass E rating and Category EXT. F. AC; - 3.10 Precipitation – a roof waterproofed with the System can adequately resist the passage of moisture provided the roof is constructed in accordance with BS 6229 and Section 10 of this Agrément, with reference to clauses 3.10.1 and 3.10.7 of this Standard. 3.3 Regulation 12: Building Standards – Conversions 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. 4 Northern Ireland - Requirements: The Building Regulations (Northern Ireland) 2012 and subsequent amendments - 23(a)(i)(iii) Fitness of materials and workmanship – the System is manufactured from materials which are considered to be suitably safe and acceptable for use as waterproofing and finishing of roofs as described in this Agrément; - 28 Resistance to moisture and weather – where the System is installed on roofs as described in this Agrément, these roofs can be designed and constructed so as to prevent the passage of moisture or water vapour; - 36(b) External Fire spread – tests indicate that on suitable substructures the use of the System will enable a roof to be unrestricted under this Requirement; the System has a Euroclass E rating and Category EXT.F AC. 5 Construction (Design and Management) Regulations 2015 and the Construction (Design and Management) Regulations (Northern Ireland) 2007 Information in this Agrément may assist the client, Principal Designer/CDM coordinator, designer and contractors to address their obligations under these Regulations.
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