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Agrément Certificate
97/3337
Product Sheet 1

RAWELL WATERPROOFING SYSTEM

RAWMAT HDB WATERPROOFING SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the Rawmat HDB Waterproofing System, for use in waterproofing and damp-proofing underground structures.

AGRÉMENT 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 system provides an effective barrier to the passage of liquid water and water vapour from the ground (see section 5).

Resistance to puncturing — the membrane is resistant to damage and has the ability to self-heal if punctured (see section 6).

Durability — when fully protected, the system provides an effective barrier to the transmission of water and water vapour for the life of the building in which it is incorporated (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. This system 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: 22 December 2008

Originally certificated on 26 February 1997

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

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.

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Regulations

In the opinion of the BBA, the Rawmat HDB Waterproofing System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	A1	Loading
Comment:		When adequately confined, the system contributes to satisfying this Requirement. See sections 8.1 and 8.2 of this Certificate.
Requirement:	C2(a)	Resistance to moisture
Comment:		The system is an effective barrier to water and water vapour. See section 5 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See section 10 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the system satisfies the requirements of this Regulation. See sections 9 and 10 and the <i>Installation</i> part of this Certificate
Regulation:	9	Building standards — construction
Standard:	1.1(a)(b)	Structure
Comment:		The application of the system will not adversely affect the building's ability to transmit loadings, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ , 1.1.2 ⁽¹⁾⁽²⁾ , 1.1.3 ⁽¹⁾⁽²⁾ and 1.1.4 ⁽¹⁾⁽²⁾ . See sections 8.1 and 8.2 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The system 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⁾ respectively. See section 5 of this Certificate.
Regulation:	12	Building standards — conversions
Comment:		All comments given for this system under Regulation 9, 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) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 10 and the <i>Installation</i> part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The system does not normally require maintenance. See section 9 of this Certificate.
Regulation:	C4(a)	Resistance to ground moisture and weather
Comment:		The system is an effective barrier to liquid water and water vapour. See section 5 of this Certificate.
Regulation:	D1	Stability
Comment:		When adequately confined, the system contributes to satisfying this Requirement. See sections 8.1 and 8.2 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 2 *Delivery and site handling* (2.1, 2.3 to 2.5) and 12 *Procedure* (12.2).

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of the Rawmat HDB Waterproofing System, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 5.1 *Substructure and ground bearing floors*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, the Rawmat HDB Waterproofing System, when installed and used in accordance with this Certificate, satisfies the requirements of the *Zurich Building Guarantee Technical Manual*, Section 3 *Substructure*, Sub-section *Basements*.

General

This Certificate relates to the Rawmat⁽¹⁾ HDB Waterproofing System for use in waterproofing and damp-proofing underground structures and is satisfactory for Type A basement construction grades 2, 3 and 4 as defined in Table 1 of BS 8102 : 1990.

The system comprises the Rawmat HDB membrane and other natural bentonite-based systems as described in the Certificate.

(1) Rawmat and Rawseal are registered trademarks of Rawell Group Holdings Ltd.

Technical Specification

1 Description

1.1 The Rawmat HDB Waterproofing System consists of a waterproofing membrane and other bentonite systems which are used to seal construction joints, form details and to ensure the membrane is continuous.

1.2 The Rawmat HDB membrane is approximately 6 mm thick and consists of a 4.6 mm central core of non-granular, pre-hydrated high-density bentonite, surfaced on both sides by geotextile fabric. The face side is a polypropylene fabric, woven with air-textured multi-filament yarns weighing 112 gm⁻². The reverse side is a polyester scrim weighing 30 gm⁻².

1.3 Rawmat HDB is manufactured in a controlled continuous process, in which sodium bentonite is hydrated, and extruded between the facing sheets. The resulting laminate is then cut to length and reeled.

1.4 Ancillary components used in the system are:

- Rawseal Waterstop — a range consisting of flexible pre-hydrated bentonite in square (SQ25), rectangular (CJ1225, CJ2025 and RC50), triangular (TR35) and strip cross-sections used to provide a seal at construction joints, form details and to ensure the membrane is continuous. Each waterstop is available in green or black. The green version should only be used in situations where it is immediately confined within the concrete, the black version contains an initial swell retardant and can be left in place for up to five days before the concrete is poured
- Rawpaste Mastic — a trowelling grade mastic, based on hydrated bentonite, designed for use with the membrane and waterstops. It is used to provide a waterproof seal at surface irregularities and at gaps around service entries. It can also be used to temporarily hold the membrane against vertical concrete surfaces
- Rawtite Rapid Bond Adhesive — a cyanoacrylate adhesive used during installation to provide a temporary bond between waterstops, membrane and substrate. It is also used as an alternative to nailing, to fix the membrane to vertical surfaces. Safety precautions are provided on each container of adhesive
- Rawtite PR Primer — an accelerating agent for use with Rawtite Rapid Bond Adhesive. It contains linear aliphatic alcohols and safety precautions are provided on each container of primer
- Rawmat Soft Washer Fixings — 30 mm diameter plastic washers with a 40 mm needle point steel nail for fixing the membrane to concrete.

1.5 Quality control is exercised over raw materials, during manufacture and on the final systems.

2 Delivery and site handling

2.1 The membrane is supplied in rolls in the sizes detailed in Table 1. Each roll contains a minimum bentonite weight of 7.5 kgm⁻².

Table 1 Packaging size and weight

Size	Nominal weight	Rolls per pallet	Nominal weight per pallet
1 m x 5 m	40 kg	30	1250 kg
2 m x 30 m	530 kg	N/A	N/A
2 m x 50 m	880 kg	N/A	N/A

2.2 The 1 m wide rolls of membrane, and Rawseal Waterstop are supplied wrapped in polythene sheet to protect them from drying out. They should be stored in the original packaging, protected from liquid water and direct sunlight and away from the possibility of mechanical damage.

2.3 The 2 m wide rolls are supplied wrapped in polythene sheeting, protected with hardboard, and labelled. They should only be moved using lifting bar and chains, incorporating a spreader bar to prevent damage to the ends of the rolls. Details of suitable lifting equipment are available from the Certificate holder.

2.4 Rawseal Waterstops are supplied wrapped in plastic film, in cardboard boxes on pallets in the sizes detailed in Table 2.

2.5 Rawpaste Mastic is supplied in 20 kg plastic buckets, 36 buckets per pallet.

Table 2 Packaging size and weight

System	Size	Metres per box	Nominal weight per box (kg)
SQ25	25 mm x 25 mm x 5 m	20	20
CJ1225	12 mm x 25 mm x 5 m	30	15
CJ2025	20 mm x 25 mm x 5 m	25	23
TR35	35 mm x 35 mm x 1 m	18	24
RC50	25 mm x 50 mm x 1 m	10	22

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Rawmat HDB Waterproofing System.

Design Considerations

3 Use

3.1 The Rawmat HDB Waterproofing System is satisfactory for use in Type A structures, in grades 2, 3 and 4, as defined in Table 1 of BS 8102 : 1990, to waterproof basements by external tanking, and to waterproof the roofs of underground structures.

3.2 The system stops the passage of water between the membrane and the concrete structure to which it is fixed. The system must be adequately confined to ensure that a watertight seal is achieved in service.

3.3 The system does not require hydrating or priming.

3.4 The system must never remain permanently exposed.

4 Practicability of installation

4.1 The system should only be installed by contractors who have been trained and appointed by the Certificate holder.

4.2 The membrane is easy to handle and can be cut using a sharp knife.

4.3 The membrane is pre-hydrated and can be formed and cut easily. It is recommended that the installation is conducted systematically, and that the backfill material or concrete is applied promptly, after installation. Temporary protection from rain or drying conditions can be provided by covering with thin plastic sheeting. The membrane must not be allowed to become saturated when unconfined. If subject to prolonged exposure to drying conditions the membrane should be sprayed lightly with water to stop curling at the edges and to ensure that the properties of the membrane are not impaired.

4.4 The Rawmat HDB membrane may be installed under most normal site conditions, including subzero temperatures but must not be installed into standing water.

5 Resistance to water and water vapour



The system provides an effective barrier to the passage of liquid water and water vapour from the ground.

6 Resistance to puncturing

The membrane is resistant to damage and has the ability to self heal if punctured. Any damaged areas can be repaired simply by overlaying a patch 150 mm larger in all directions to the damaged area and nailing in place to secure. If the damage is more extensive, the membrane should be replaced with a fresh sheet and the Certificate holder's advice should be sought.

7 Chemical resistance

7.1 The membrane is pre-hydrated, and is relatively unaffected by electrolytes. Site specific advice can be obtained from the Certificate holder.

7.2 Rawmat is not affected by organic contaminants and can tolerate acidic or alkaline conditions.

8 Resistance to loading



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

8.2 The membrane is not fully bonded to the substrate and can thus accommodate any likely structural movement in service, eg differential settlement or movement at joints.

9 Maintenance



As the system is confined by the concrete/backfill and has suitable durability, (see section 10) maintenance is not required.

10 Durability



A fully-protected Rawmat HDB Waterproofing System, will provide an effective barrier to the transmission of liquid water and water vapour for the life of the building in which it is incorporated.

Installation

11 General

Rawmat HDB membrane

11.1 The Rawmat HDB membrane must be installed on flat, smooth surfaces without wrinkles or creases in the membrane.

11.2 The Rawmat HDB membrane is applied with the scrim geotextile side in contact with the walls and roof of the structure. However, under a floor slab the membrane can be laid onto a blinded concrete surface and laid with the woven fabric side uppermost.

11.3 Rawmat HDB must be contained properly to ensure that a watertight seal is achieved in service. The quality of the backfilling operation is therefore important in order to achieve the required compaction, and should be adequately supervised on site.

11.4 Sheets should be arranged to provide minimum lap joints of 100 mm. These joints may be temporarily secured by Rawmat Soft Washer Fixings, Rawtite Rapid Bond Adhesive, or caulked with Rawpaste Mastic. Wherever possible, sheets should be staggered to prevent a concentration of laps at any particular point.

11.5 The Certificate holder's advice should be sought concerning installations involving movement joints.

12 Procedure

Horizontal surfaces

12.1 Surfaces to be waterproofed may be damp, but should be reasonably smooth and compacted (any cracks or voids should be filled and levelled using Rawpaste Mastic) and free from standing water.

12.2 The surface should be prepared including a 50 mm blinding layer where required. The membrane may be either rolled out manually for the 1 m wide rolls or by machine with a suitable lifting device and spreader bar.

12.3 Before the placing of reinforcement on studs, the membrane is usually protected by covering with a 50 mm screed of blinding concrete. The concrete should be placed over the membrane following the direction of the overlaps to avoid folding of the membrane or concrete getting between the sheets. If a protective concrete blinding is not applied, small pads or cushions of concrete should be placed underneath the studs to spread the load.

12.4 To seal piles or vertical penetrations through the membrane the surface of the penetration shall be brushed clean and free of debris. The base of the penetration should receive a layer of Rawpaste Mastic and a length of Rawseal TR35 fillet should be fitted tightly and joined to form a continuous seal. A patch piece 150 mm larger than the penetration in all directions should then be sealed to the penetration before the main sheet is applied and trimmed around. To complete the seal additional Rawpaste Mastic is applied (see Figure 1).

12.5 The membrane should extend a minimum of 150 mm outside the perimeter of the construction to enable a good lap joint to be made with the vertical sheets. Alternatively the membrane should be turned vertically up the face of the shutter and nailed in place.

12.6 The applied membrane is covered with poured concrete soon as possible after placing.

Vertical surfaces

12.7 Connection with any horizontal Rawmat HDB membrane protruding from the bottom of the slab should be made using Rawseal TR35 fillet working from the base up the wall. The horizontal membrane should be cleaned prior to any overlapping, see Figure 2.

12.8 Alternatively the horizontal membrane can be turned vertically up the floor slab shutter and held in place while the slab is poured. The vertical membrane will then overlap this sheet to ensure continuity (see Figure 3).

12.9 The membrane can be fixed to the vertical surface using Rawmat Soft Washer Fixings fastened every 400 mm, to spread the load. Alternatively, the wall is first spot primed with Rawtite PR Primer, then Rawtite Rapid Bond Adhesive is applied in spots or beads onto the membrane surface and pressed against the primed concrete to form an instant seal.

12.10 Alternatively the membrane can be applied to the inside face of the shuttering and subsequently filled with the poured concrete.

Figure 1 Pipe penetration through a floor

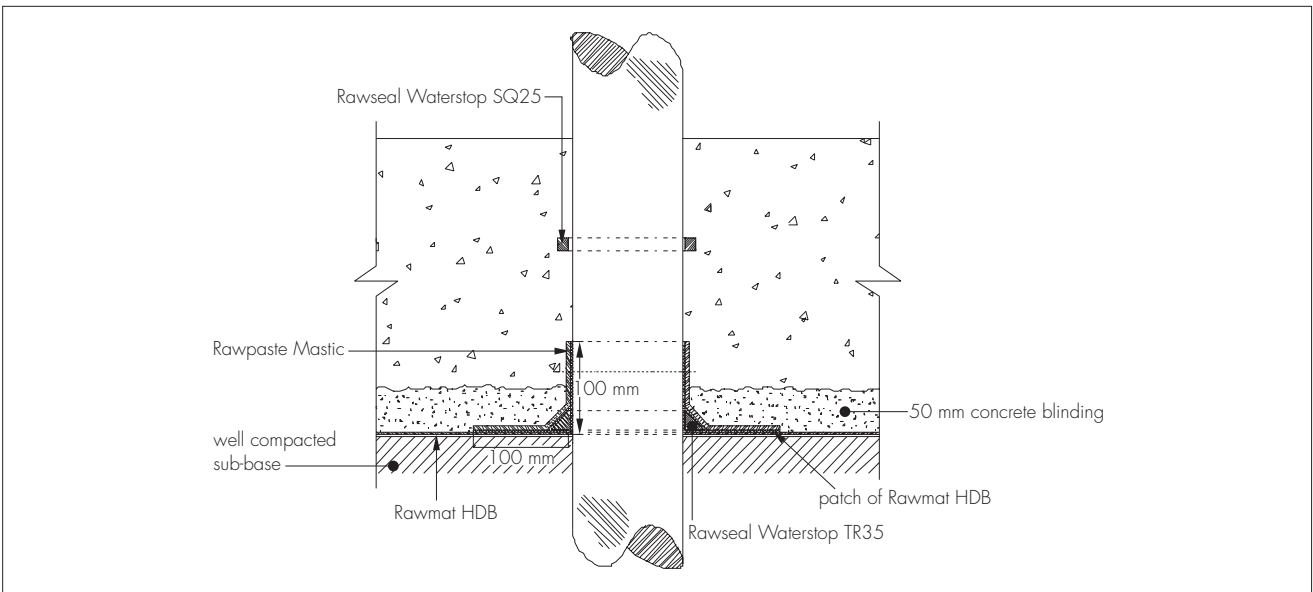


Figure 2 Slab to wall junction – detail A

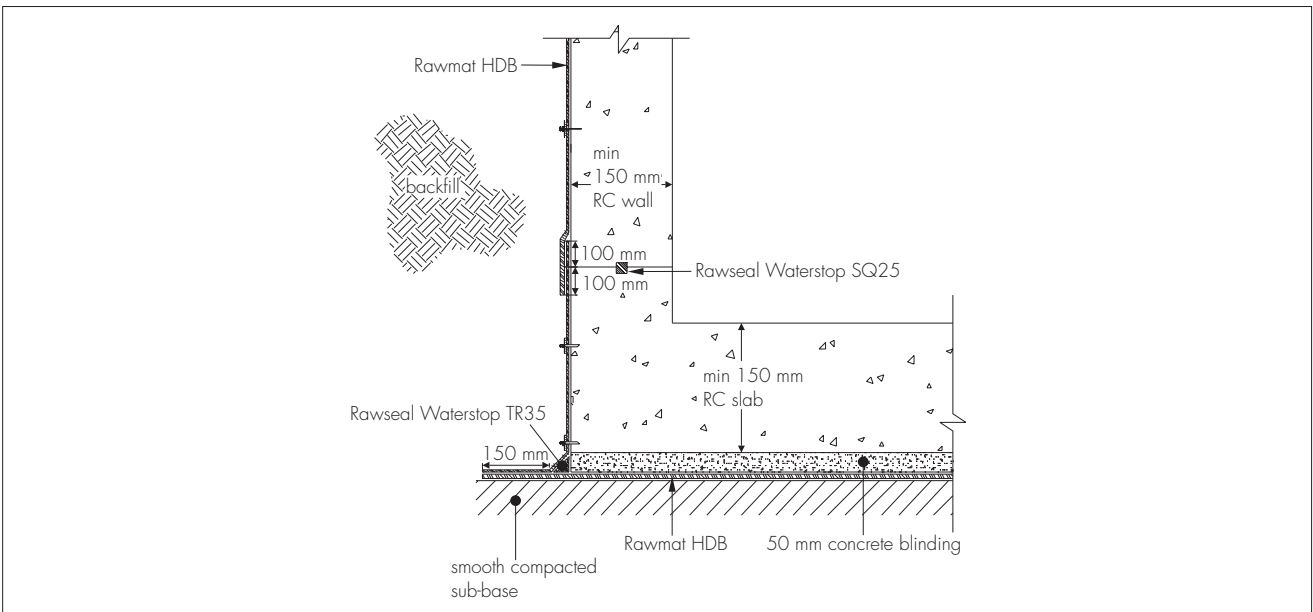
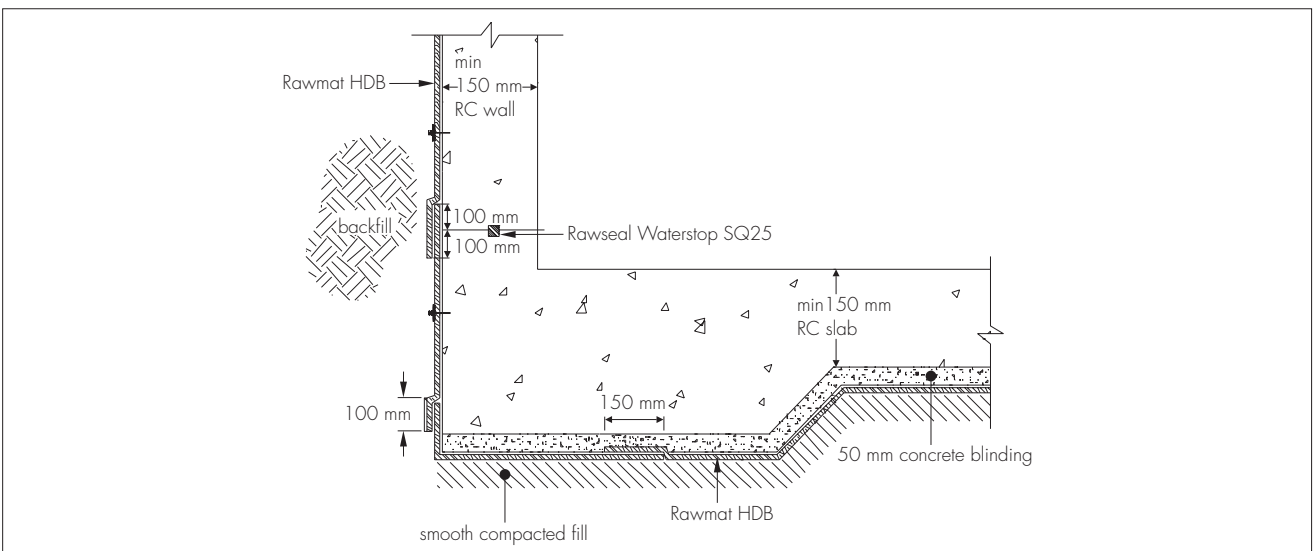


Figure 3 Slab to wall junction – detail B



12.11 Backfilling should be carried out as soon as possible after placing the Rawmat HDB sheets. Backfill material should be free from building debris and angular aggregate, and should be compacted to a minimum 85% Modified Proctor.

12.12 To prevent soil or debris from damaging the membrane a protection board or positive drainage can be used. The Certificate holder should be contacted for advice on suitable systems.

13 General

Rawseal Waterstop

13.1 Prior to pouring the slab or wall, a void former can be fixed into the shuttering or concrete to create a rebate in the centre of the joint, into which the Rawseal Waterstop can be applied. This rebate should be the width of the Rawseal profile and half the depth. The Certificate holder should be consulted for advice on the profile suitable for specific applications.

13.2 In situations where exposure to wet conditions prior to the concrete being poured is likely, the Rawseal black waterstops should be used.

13.3 If expansion joints are required, a suitable water bar should be used. The Certificate holder can advise on suitable systems and installation procedures.

13.4 Where construction joints are in either the slab or vertical walls the concrete should be a minimum thickness of 150 mm with the waterstop located centrally within the concrete, to ensure that a minimum of 75 mm concrete cover is provided to all sides of the waterstop.

14 Surface preparation

14.1 Once the concrete is ready for the application of the waterstop, the void former is removed and the joint cleaned removing any debris and ensuring it is free from cavities and spalling. Any excessive irregularities in the surface should be filled with a suitable strength cement grout or mortar.

14.2 The waterstop is placed into the rebate, and the lengths butted and kneaded together to form a continuous homogeneous length of bentonite. T-joints and cross joints can be formed in a similar manner.

14.3 In situations where a rebate is not formed the Rawseal Waterstop should be placed inside the outermost reinforcing bars, onto the clean prepared surface and pressed into the concrete, ensuring adequate contact with the concrete. The waterstop is secured in place at 300 mm to 400 mm centres using nails.

14.4 Care should be taken to ensure the compaction of the concrete does not dislodge the waterstop in the joint.

14.5 If the waterstop material exhibits significant swelling prior to confinement in the joint, it must be replaced with new material.

Technical Investigations

15 Tests

15.1 A trial installation was built using the Rawmat HDB Waterproofing System and observations were made of the ease of installation at corners, laps and around obstructions, and the rate and pattern of water penetration.

15.2 Tests were conducted to determine the resistance to electrolytes.

16 Investigations

16.1 The manufacturing process was examined, and the raw material specifications and quality control procedures established.

16.2 An assessment was made of independent reports relating to:

- resistance to hydrostatic pressure⁽¹⁾
- effect of wet/dry cycling⁽¹⁾
- freeze/thaw resistance⁽¹⁾
- effect of electrolytes
- resistance to loading
- chemical resistance.

16.3 Visits were made to sites in progress to assess the application properties of the system.

16.4 A survey of contractors was conducted to assess the system's application properties and performance in use.

Bibliography

BS 8102 : 1990 *Code of practice for protection of structures against water from the ground*

17 Conditions

17.1 This Certificate:

- relates only to the system/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

17.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the system/system and the manufacture and/or fabrication including all related and relevant 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.

17.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the system/system or any other system/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the system/system
- individual installations of the system/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the system/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

17.5 Any information relating to the manufacture, supply, installation, use and maintenance of this system/system which is contained or referred to in this Certificate is the minimum required to be met when the system/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this system/system.