Use of KA Tanking Slurry in Waterproofing of Masonry and Blockwork in:

Basements
Bathrooms and kitchens
Car parks and garages
Commercial areas
Lift shafts
Residential areas
Vehicle maintenance pits
Swimming pools
Water tanks

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1. KA tanking slurry

a. What is KA Tanking Slurry

KA Tanking Slurry is a grey cementitious compound containing Portland cement, graded quartz sands, aggregates and chemical additives. It is supplied in powder form.

KA Super Plug is a cement based quick-setting hydraulic compound used to staunch running water or seepage through concrete.

b. How it works

On site, KA tanking slurry is mixed with water to form a smooth paste. The paste is applied directly to concrete or masonry structures and penetrates a short distance into capillary cracks, fissures and pores in the surface of the concrete. The presence of water and free lime causes the tanking slurry to form insoluble crystals which block the pores and prevent passage of water. This effectively makes the concrete water tight for the lifetime of the structure.

c. Where it can be used

KA Tanking Slurry can be applied by brush or spray to new or old structurally sound surfaces, without a bonding coat, either to the internal or the external side. It can be applied to both horizontal and vertical surfaces. Surfaces should be prepared to have a capillary open structure.

The waterproofing barrier should run continuously around the whole structure.

The product is for use where the basement is above the level of the water table.

KA Tanking Slurry can be used for the three grades of protection of basements described in BS8102:

- Grade 1 for car parking
- Grade 2 for plant rooms, workshops and garages
- Grade 3 for residential and commercial areas.

KA Tanking Slurry has passed the tests of WRAS Water Regulations Advisory Scheme, BS6920 and is approved for drinking water structures such as reservoirs and concrete drinking water tanks.

It can also be used in swimming pools, retaining walls, tunnels and lift shafts.

d. Coverage

A two-layer application requires about 3 kg/m2 of powder, but this depends on the roughness of the surface.

e. Packaging

KA Tanking Slurry is supplied in powder form in 25kg plastic tubs

KA Super Plug is supplied in powder form in 5kg plastic tubs

KA Fillet Seal is supplied in powder form in 25kg plastic tubs

f. Storage

Store in a dry place and protect from frost. The shelf life of KA Tanking Slurry is 12 months when stored in unopened containers.

2. Compliance with Building Regulations and British Standards.
The relevant Building Regulations that apply to tanking systems for waterproofing are in

- Approved Document Part C2 Resistance to Moisture
- Approved Document Basements for Dwellings.
- Regulation 7, Materials and Workmanship

The British Standard is

- BS8102:2009 Code of practice for protection of below ground structures against water from the ground

In addition, British Standard BS6920:2000 Suitability of non-metallic products for use in contact with water intended for human consumption gives test requirements for potable water contact.

2.1 Approved Document Part C2 Resistance to Moisture
The floors, walls and roof of the building shall adequately protect the building and people who use the building from harmful effects caused by:
(a)Ground moisture
(b)Precipitation and wind-driven spray
(c)Interstitial and surface condensation
(d)Spillage of water from or associated with sanitary fittings or fixed appliances.
Section 4.2: Floors next to the ground should:
(a)Resist the passage of ground moisture to the upper surface of the floor
(b)Not be damaged by moisture from the ground
(c)Not be damaged by groundwater
(d)Resist the passage of ground gases. Remedial measures will include a gas resistant barrier.

KA Tanking Slurry used in a basement floor would protect against ground moisture.
Similarly Section 5.2: Walls states that walls should:
(a)Resist the passage of moisture from the ground to the inside of the building
(b)Not be damaged by moisture from the ground and not carry moisture from the ground to any part which would be damaged by it.

If the wall is an external wall, it should:

(c)Not be damaged by groundwater
(d)Resist the passage of ground gases. Remedial measures will include a gas resistant barrier.

KA Tanking Slurry used in walls protects buildings against ground moisture.
The other sections of Part C are not applicable to this type of product, since the majority of Approved Document C is aimed at new buildings. A more relevant Approved Document is Basements for Dwellings.

2.2 Approved Document "Basements for Dwellings"

Approved Document "Basements for Dwellings" forms part of the Building Regulations 2000. This publication supplements the basic level of guidance provided in each part of the Building Regulations, such as Part C, and provides guidance on the design and construction of basements for dwellings. It describes the means of meeting the relevant performance requirements of the Building Regulations.

Where resistance to moisture is concerned, this Approved Document is closely linked with BS8102:2009 Code of practice for protection of below ground structures against water from the ground.

2.2.1 Section 2.4 Exclusion of Moisture

Walls and floors below external ground level and the junctions between them should:

(a)Provide resistance to ground moisture reaching the internal surface of the wall or upper surface of the floor so that the environmental conditions within the basement are appropriate to the intended use.

(b)Not be damaged by moisture from the ground

BS8102:2009 gives 3 grades of waterproofing protection

Grade	Example of use of structure	Performance level
1	Car parking, plant rooms (excluding electrical equipment), workshops	Some seepage and damp areas tolerable, dependent on the intended use.
2	Plant rooms and workshops requiring a drier environment (than Grade 1); storage areas	No water penetration acceptable. Damp areas tolerable, ventilation might be required.
3	Ventilated residential and commercial areas, including offices, restaurants etc.; leisure centres	No water penetration acceptable. Ventilation, dehumidification or air conditioning necessary appropriate to the intended use.

Table 1. Grades of waterproofing protection described in BS8102:2009 and Approved Document Basements for Dwellings

2.2.2 Selecting and Constructing a Waterproofing System

The Approved Document provides an appendix (2A) with a flow chart containing the following steps:

1. Determine the position of the water table
2. Determine the drainage characteristics of the soil
3. Determine whether the waterproofing system should be made continuous or whether discontinuity may be acceptable
4. Select an acceptable construction type
5. Determine type of foundation and its suitability for providing continuity of waterproofing.
6. Confirm that the selected foundation type and waterproofing can achieve the required water resistance
7. Assess the range of suitable primary waterproofing systems. Select and confirm the suitability of the waterproofing system.
8. Ensure adequate waterproofing details are provided for the system
9. The solution is likely to meet the requirements of the Building Regulations if:

(a)Each item has been considered and adequate account has been taken of the associated factors.

(b)The waterproofing system meets the conditions of its Technical Approval where relevant

(c)The design proposals are in accordance with the suppliers' recommendations

2.2.3 How KA Tanking Slurry meets the requirements of the Building regulations

This section goes through the steps 1-9 above, and shows where KA tanking slurry can (and can't) satisfy the requirements of the Approved Document and BS 8102:2009.

Step 1. Determine the position of the water table

Steps 2 and 3, Determine the drainage characteristics of the soil and hence the need for continuity of waterproofing

Position of water table	Drainage characteristics of soil	Can site be drained effectively?	Requirement for waterproofing in soils without gases	Requirement for waterproofing in soils if gases present
Low	Excellent	Yes	Discontinuity might be possible	Needs to be continuous
	Good			
	Fair to poor			
		No	Needs to be continuous	
Variable	Any			
High				

Table 2. Requirement for continuity of waterproofing

Tanking is a barrier method of waterproofing and is described as a type A protection system, which can be used to give both continuous and discontinuous protection. Diagram 1 shows how tanking slurry can give continuous waterproofing when applied either internally or externally.

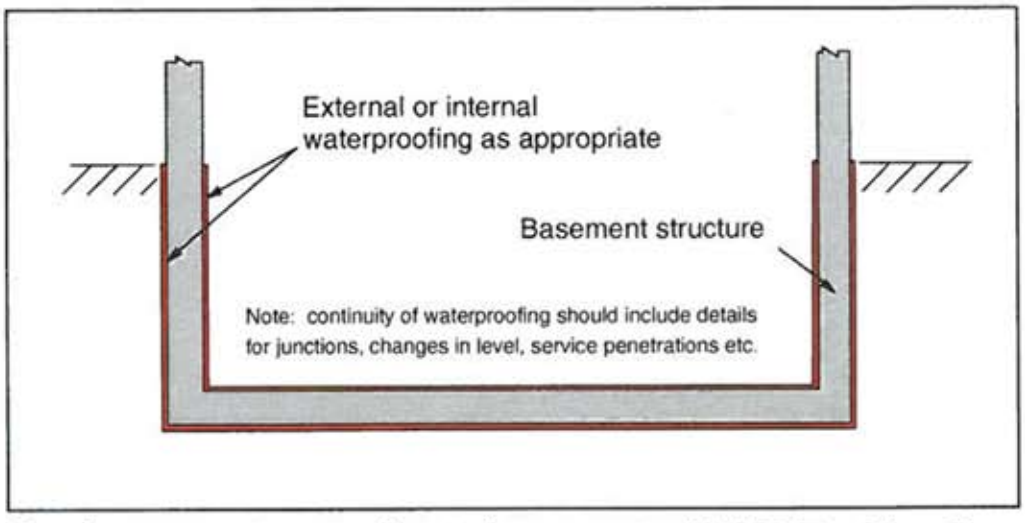

Diagram 1. Continuous waterproofing to basement with KA Tanking Slurry
Within Type A protection, cementitious crystallisation active systems are in category 6.

The suitability of cementitious tanking as a primary waterproofing system based on the position of the waterproofing system is shown in the table below:

Position of waterproofing system	Type A
External	Yes
Sandwich	Yes
Internal	Yes
Integral	N/A

Table 3. Suitability of tanking slurry depending on the position of the waterproofing system.

Diagram 2 illustrates the different positions of waterproofing.

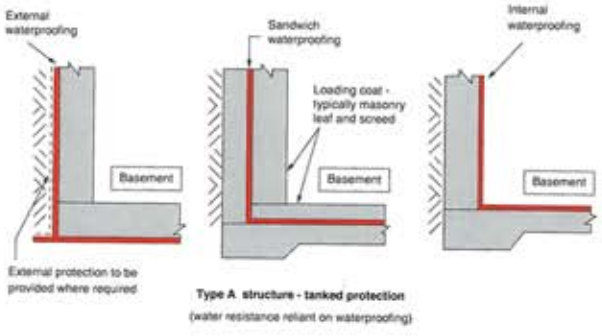

Diagram 2. External, sandwiched and internal waterproofing

Step 4 Select an acceptable construction type
The acceptability of a Type A Barrier Protection with KA Tanking Slurry depends on the position of the water table as shown in Table 4.

Water Table	Waterproofing	Plus drainage
Low	Yes	Yes
Variable	Maybe acceptable when variability is due to surface water or other infrequent occurrences and not due to an actual ride in the water table.	Maybe acceptable when variability is due to surface water or other infrequent occurrences and not due to an actual ride in the water table.
High	Not recommended	Not recommended

Table 4. Suitability of Type A Barrier Protection with KA Tanking Slurry according to water table

Steps 5, 6 Determine proposed form of foundation, depending on whether continuity of waterproofing is required.

Step 7. Select suitable waterproofing system.
Tanking slurry is an acceptable waterproofing system provided steps 1 - 6 are satisfied.

Step 8. Ensure adequate details are provided.
Examples of details of the application of tanking slurry are given in diagrams 2 – 5.

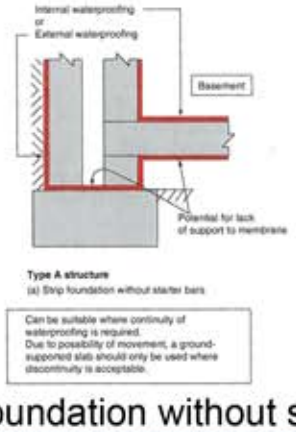

Diagram 3. Strip foundation without starter bars

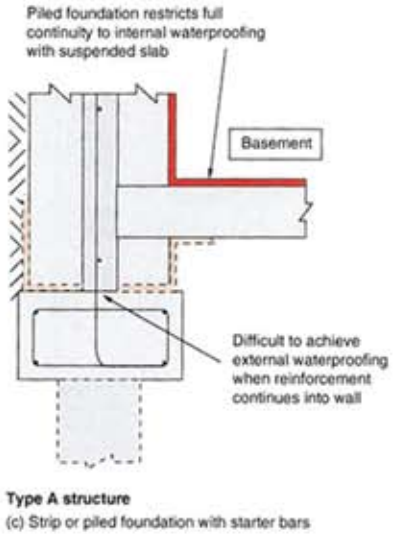

Diagram 4. Strip or piled foundation with starter bars

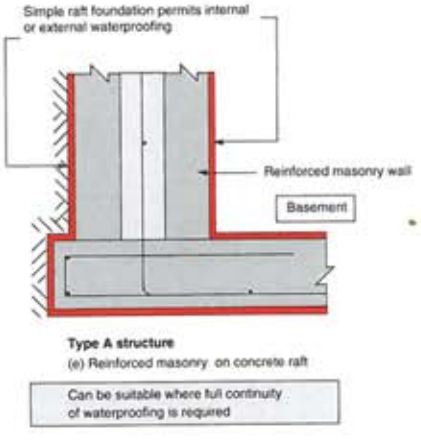

Diagram 5. Reinforced masonry on concrete raft

Step 9. The solution is likely to meet the requirements of the regulations if
(a)Each item has been considered and adequate account has been taken of the associated factors.
(b)The waterproofing system meets the conditions of its Technical Approval where relevant
(c)The design proposals are in accordance with the suppliers' recommendations

2.3 Approved Document to support Regulation 7
Regulation 7 requires that building work is carried out:
(a)With adequate and proper materials which:

(i) Are appropriate for the circumstances in which they are used;
(ii) Are adequately mixed or prepared, and:
(iii) Are applied, used or fixed so as adequately to perform the functions for which they are designed, and:

(b)In a workmanlike manner
The suitability of a material for use can be assessed by several means, including:
(i) British Standards.
The British Standard which applies to tanking is BS 8102:2009 Code of practice for protection of below ground structures against water from the ground. This is discussed below.
(ii) Tests and calculations
The resistance to water pressure of KSA Tanking Slurry has been measured by Elotex GmbH, Frankfurt according to BS EN 196: The treated concrete resisted positive water pressure up to 7 bars of pressure.
(iii) Past experience

The material can be shown by experience, such as a building in use, to be capable of performing the function for which it is intended.

KA Tanking Slurry has been in use for over 10 years and has been applied to many buildings in that time.

2.4 Compliance with standard BS 8102:2009 Code of practice for protection of below ground structures against water from the ground

BS8102:2009 is very similar in structure and content to Approved Document “Basements for Dwellings”.

Cementitious crystallisation barriers are described as Type A barrier protections, and details are in Section 8.2.6.

BS8102 gives the following guidelines concerning tanking barriers.

• Cementitious crystallisation barriers should be applied to either internal or extermnal surfaces of the concrete structure by brush or spray. They are suitable for use on new and existing structures and do not require a loading coat.

• Horizontal Applications - cementitious crystallisation barriers can be applied as a single coat slurry to hardened concrete or dry sprinkle and trowel-applied fresh concrete. They can also be applied to concrete blinding immediately prior to the placing of overlaying concrete.

• Vertical Applications – the barrier should be applied in a two-coat application to all vertical surfaces.

Provided these guidelines are followed, then KA Tanking Slury satisfies the requirements of BS8102:2009.

3Instructions for Use

3.1 Preparation

Surface preparation is crucial and must be carried out thoroughly. The surface must.present an open capillary structure to allow penetration of the crystalline chemicals.

All surfaces should be clean and free of paint systems, oil, loose dust , shutter treatments, curing compounds, surface hardeners and other contaminants. Surface preparation can be carried out best by high pressure water jetting, grit blasting or mechanical scrabbling.

Large cracks and other defects can be repaired using a 3:1 sand : cement mortar gauged with SBR. Repaired areas can be coated with KA Tanking Slurry after 24 hours, but large areas of new brickwork, poured concrete or cement renders should be allowed to cure for 3 days before application of KA Tanking Slurry.

Timber battens and fixings must be removed before treatment commences. Provision for re-fixing of battens should be made in the wall prior to application of Tanking Slurry. Drilling for fixtures should not be carried out after tanking as the holes would provide a release for any hydrostatic pressure behind, with resultant leakage of water.

3.2 Fillets

It is recommended that KA Fillet Seal is used at internal junctions of floors and walls. If it is impractical to provide a fillet between floor and wall, then a saw cut should be made in the floor slab as close to the wall as possible and KA Tanking Slurry allowed to flow into the saw cut.

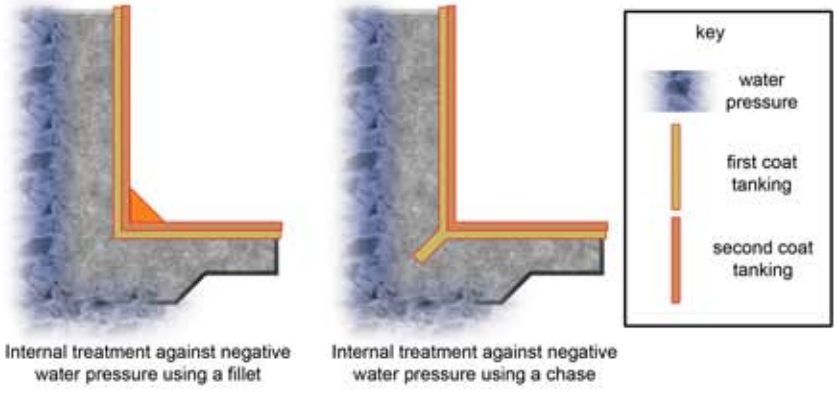

Diagram 6. Internal treatment against negative pressure using a fillet and a chase.

3.3 Plugging

In locations where running water is evident, this would suggest some degree of hydro-static pressure that must be dispersed to present a satisfactory damp substrate onto which the KA Tanking Slurry can be applied.

KA Super Plug is mixed 4:1 with water with a gloved hand into a ball and then place directly onto the leaking substrate. Hold for 30 seconds or until the KA Super Plug is firm to the touch.

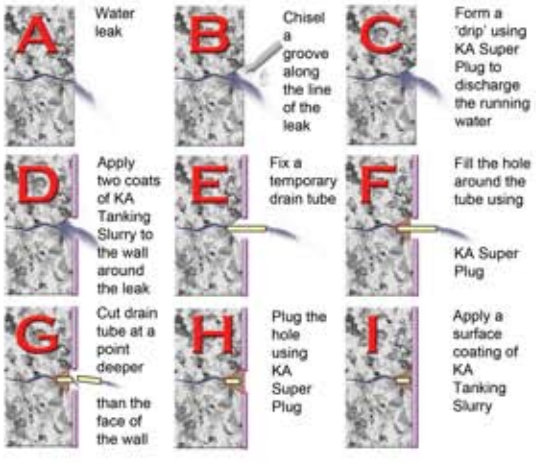

Diagram 7. Procedure for plugging a water leak..

3.4 Mixing

It is important not to mix more material than can be applied within 30 minutes at 20°C, or less in hot conditions. The recommended mix ratio is approximately 2.5 to 3 parts KA Tanking Slurry to 1 part clean water by volume.

Pour the required amount of water into a clean bucket and add the powder slowly, mixing to a smooth lump-free consistency.

For example, 5 litres of water will require 12.5 to 15 kg KA Tanking Slurry.

If the mixed material becomes stiff, do not re-mix with water, but discard and prepare fresh material.

3.5 Application

It is critical that all surfaces being treated with KA Tanking Slurry are clean and have been properly prepared. Always apply the mix to a pre-dampened surface. Porous substrates require more dampening than dense ones. Normal problems of damp and water ingress can be addressed by applying two coats of KA Tanking Slurry over the whole area.

Brush the first coat of mix firmly onto the pre-dampened area, using a medium hard short bristle type of brush. The nominal thickness of the first coat should be between 1 and 1.5mm.

The second coat may be applied as soon as the first coat has become "touch-dry". In warm conditions, spray a fine mist of water over the surface of the first coat. Apply the second coat at right angles to the first to ensure complete coverage. This may be applied by trowel to give a dense smooth finish.

3.2 Ventilation and curing

Uniform hardening and water tightness can be assured if the product is not allowed to dry out too rapidly, under moist conditions for at least three days. It is recommended that ventilation is provided as lack of it may cause small condensation beads to form on the surface of the KA Tanking Slurry. Protect the coating against excessively fast evaporation in hot conditions or drying winds. If these conditions prevail, mist spray the surface regularly.

Dehumidifiers should not be used immediately after the application of KA Tanking Slurry as this would arrest the curing system.

3.3 Plastering or rendering

Remedial plaster systems may be used over KA Tanking Slurry provided an intermediate bonding compound is employed. Dilute SBR latex with an equal volume of water and apply to the cured TS and allow to become tacky but not dry. Plaster may then be applied as normal. Where cement rendering is required, use an intermediate bonding slurry mixed at two parts sand : one part cement gauged with a 1:1 SBR : water mix. Apply the slurry to the tanking and apply the first render coat before the slurry dries.

A period of at least 6 months should be allowed before permanent decoration is considered. During this period use only permeable emulsion paints.

3.4 Clean up and Spillages

Spillages should be cleaned up promptly. Non hardened material may be removed from surfaces or tools with water.

3.5 Health and Safety

Protect eyes and skin from contact. Freshly mixed KA Tanking Slurry is alkaline, the use of suitable gloves and eye protection is recommended.

Powdered products should be handled to minimise dust formation. In a confined area or of excessive dust is formed than a suitable mask must be worn.

A full Material Safety Data Sheet is available on request.

4. Technical Information

Water resistance test – Elotex – 7 bar positive pressure to EN 196. , BS12390-8-2009 and BS3921 ESG Ukas Acredited