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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
15/5278
Product Sheet 1

XP WATERPROOFING SYSTEM FOR STRUCTURES

ULTRASEAL XP

This Agrément Certificate Product Sheet(1) relates to Ultraseal XP, an active hydrophilic polymer geotextile membrane for use in waterproofing and damp-proofing underground reinforced concrete structures which are under continuous or intermittent hydrostatic pressure.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

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

Resistance to mechanical damage — the product is resistant to damage and has the capacity to self-repair if punctured (see section 7).

Durability — when fully protected, the product provides an effective barrier to the transmission of water and water vapour for the life of the structure in which it is incorporated (see section 12).

The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 26 November 2015

John Albon — Head of Approvals
Construction Products

Claire Curtis-Thomas
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.

Regulations

In the opinion of the BBA, Ultraseal XP, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

The Building Regulations 2010 (England and Wales) (as amended)

Requirement:	A1	Loading
Comment:		When adequately confined, the product contributes to satisfying this Requirement. See section 9 of this Certificate.
Requirement:	C2(a)	Resistance to moisture
Comment:		The product is an effective barrier to water and water vapour. See section 6 of this Certificate.
Regulation:	7	Materials and workmanship
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		Use of the product satisfies the requirements of this Regulation. See section 12 and the *Installation* part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1(a)(b)	Structure
Comment:		The application of the product 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 section 9 of this Certificate.
Standard:	3.4	Moisture from the ground
Comment:		The product is an effective barrier to liquid water and water vapour, with reference to clauses 3.4.1[1][2], 3.4.2[1][2], 3.4.5[1][2], 3.4.6[1][2] and 3.4.7[1][2]. See section 6 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The product can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the product under Regulation 9, Standards 1 to 6 also apply to this Regulation, with reference to clause 0.12.1[1][2] and Schedule 6[1][2].

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:		The product is acceptable. See section 12 and the *Installation* part of this Certificate.
Regulation:	28(a)	Resistance to moisture and weather
Comment:		The product is an effective barrier to liquid water and water vapour. See section 6 of this Certificate.
Regulation:	30	Stability
Comment:		When adequately confined, the product contributes to satisfying this Requirement. See section 9 of this Certificate.

Construction (Design and Management) Regulations 2015

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

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

See sections: 3 *Delivery and site handling* (3.1 and 3.4) and 13 *General* (13.2) of this Certificate.

Additional Information

NHBC Standards 2014

NHBC accepts the use of Ultraseal XP, provided it is installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 5.1 *Substructure and ground bearing floors*, clauses D16 (requiring proprietary waterproofing materials to comply with Technical Requirement R3) and M10 (requiring a system or product to be assessed in accordance with Technical Requirement R3).

CE marking

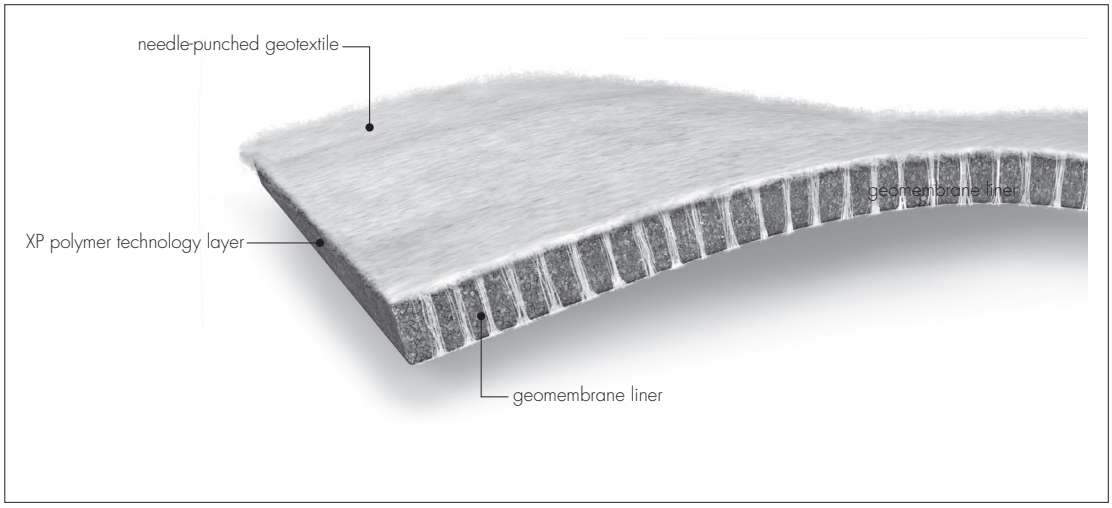
The Certificate holder has taken the responsibility of CE marking the product in accordance with harmonised European Standard BS EN 13491 : 2006 and BS EN 13967 : 2012. An asterisk (*) appearing in this Certificate indicates that data shown are given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Ultraseal XP is a 2.8 mm thick waterproofing membrane consisting of two polypropylene geotextiles, one woven and one non-woven, enclosing an active hydrophilic polymer blend, integrally bonded to a polypropylene liner (see Figure 1).

Figure 1 Cross-section through Ultraseal XP



1.2 Ancillary items for use with the product include:

- Waterstop XP — a rectangular section, flexible, blue extruded strip of active expanding hydrophilic polymer/ butyl rubber, with one side backed by a silicone release paper, available in coils 15 mm wide by 10 mm thick by 6 m long. The product is used as a water bar at reinforced concrete construction joints and around penetrations in underground concrete foundations and structures
- Revo-Fix Mesh — a profiled metal overlay strip used to prevent Waterstop XP from moving during the pouring and placement of concrete at construction joints
- Cetseal — a multi-purpose, single-component moisture-cure adhesive, used to prevent Waterstop XP from moving during the pouring and placement of concrete at construction joints and around penetrations
- Coretex XP — a 2.3 mm thick active hydrophilic polymer geotextile used for detailing work
- Seal-X XP — a trowel-grade mastic, for detailing use around penetrations, corner transitions and terminations
- CETCO SeamTape — sealant tape for membrane overlaps.

2 Manufacture

2.1 The product is manufactured in a controlled continuous process in which the hydrophilic polymer blend and adhesive are uniformly distributed between woven and non-woven geotextiles. The two geotextiles are interlocked by a needlepunching process, which links the geotextiles and contains and confines the hydrophilic polymer blend.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

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

3 Delivery and site handling

3.1 The product is supplied in rolls 1.15 m wide by 8.7 m long, or 2.2 m wide by 9.1 m long, wrapped and labelled with the product name, dimensions and product information, and delivered on pallets. The 1.15 m by 8.7 m

rolls, weighing 18.3 kg each, are packaged 30 units per pallet; the 2.2 m by 9.1 m rolls, weighing 36.6 kg each, are packaged 20 units per pallet.

3.2 Ancillary items are packaged as shown in Table 1.

Table 1 Ancillary items — packaging

Component	Unit	Delivery packaging	Weight
Waterstop XP	6 m coil	Box of 8, 36 boxes per pallet	10.5 kg per box
Cetseal	290 ml cartridge	Box of 12	5.4 kg per box
Coretex XP	1.55 m x 6.45 m roll	Pallet of 30 rolls	15.5 kg per roll
Seal-X XP	Pail	Pallet of 36	25 kg per pail

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

3.4 Seal-X XP must be stored at temperatures of between 16°C and 27°C, in a dry storage area away from sources of heat. Protective clothing and eye protection must be worn, and eye and skin contact must be avoided.

Assessment and Technical Investigations

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

Design Considerations

4 Use

4.1 Ultraseal XP is satisfactory for use in waterproofing and damp-proofing underground reinforced concrete structures and reinforced masonry block walls, and is satisfactory for Type A reinforced concrete basement construction for all grades as defined in Table 2 of BS 8102 : 2009.

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

4.3 Waterstop XP is satisfactory for use as a water bar in reinforced concrete construction joints, on Type B constructions as defined in BS 8102 : 2009. It is also used as an accessory in structures waterproofed with Ultraseal XP.

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

4.5 The product and components must never remain permanently exposed.

5 Practicability of installation

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

6 Resistance to water and water vapour

Results of tests confirm that the membrane, including joints, when completely sealed and consolidated, will adequately resist the passage of moisture from the ground.

7 Resistance to mechanical damage

The membrane is robust and resistant to normal site activities. The dropping of heavy objects will normally have no damaging effect on the membrane. Any accidental cuts will self-heal when the membrane is hydrated following correct installation, provided that polymer material is not lost from the edges of the cut. If the damage is more extensive or material is lost from the membrane, it must be repaired (see section 15).

8 Chemical resistance

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

8.2 The membrane is not affected by organic contaminants.

9 Resistance to loading

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

10 Adhesion

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

11 Maintenance

As the product is confined by the concrete and has suitable durability (see section 12), maintenance is not required. Any damage occurring during installation must be repaired in accordance with section 15.

12 Durability

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

Installation

13 General

13.1 Ultraseal XP may be applied under most normal site conditions, including sub-zero temperatures and during rainfall. Under wet conditions the product can withstand light construction traffic without significant extrusion of the polymer blend. Slight losses at the exposed edges of a lap joint will not impair the watertightness, provided the conditions given in section 13.6 are met. Any polymer blend that extrudes from the membrane will become slippery when wet which can have an adverse effect on site safety.

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

13.3 Ultraseal XP is easy to handle and can be cut using a sharp knife.

13.4 Ultraseal XP is installed with the needle-punched geotextile core in contact with the concrete surface to be waterproofed.

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

13.6 The formation of a continuous waterproof barrier is achieved using lap joints with a minimum overlap of 100 mm between adjoining edges and roll ends. It is recommended to stagger laps at a minimum of 300 mm to avoid four sheets overlapping in one location. All lap joints are secured by either stapling laps together or with proprietary washer-headed fasteners.

13.7 Sealing around protrusions through the membrane, eg at such details as piles and service pipes, is carried out by cutting a hole in the membrane and fitting over the protrusion, bedding the membrane onto Seal-X XP.

14 Procedure

Ultraseal XP — vertical surfaces

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

14.2 On cast concrete substrates, the product is aligned horizontally (although vertical alignment is possible) and fixed through the overlaps using proprietary washer-headed fasteners. CETCO Seamtape is applied centred along the membrane seams in order to overband membrane overlaps prior to backfill. When fixed to the inside face of shuttering, the product is aligned vertically (although horizontal alignment is possible) ensuring that all laps face down, away from the flow of the poured concrete. The overlaps are secured to the shuttering using nails or staples. A minimum overlap of 100 mm must be achieved between the vertical membrane and the membrane protruding from the base slab.

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

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

Ultraseal XP — horizontal surfaces

14.5 Surfaces to be waterproofed must be reasonably smooth and may be damp, but free from standing water. Earth and sand substrates should be compacted to a minimum 85% Modified Proctor.

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

14.7 Overlaps must be stapled or nailed to prevent displacement during concrete placement.

14.8 The concrete slab to be poured must have a minimum thickness of 150 mm.

Installation of Waterstop XP

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

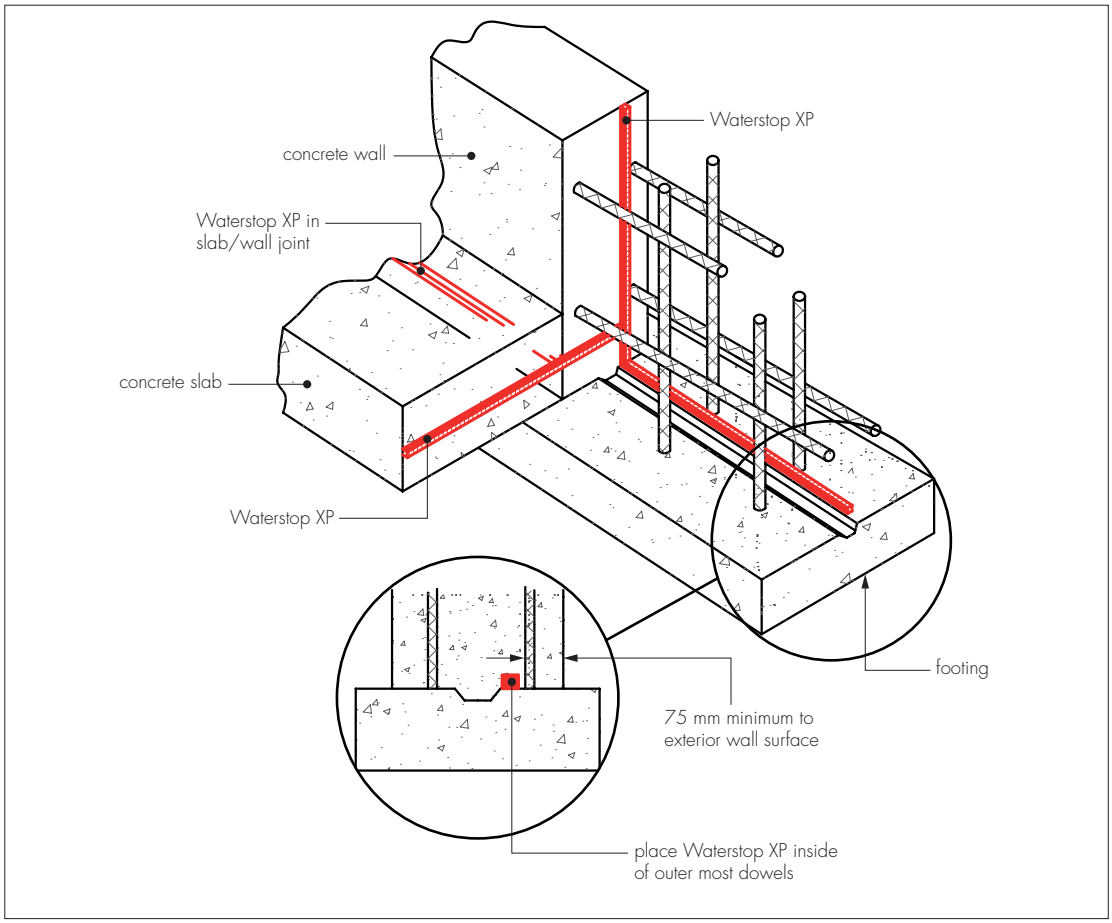
14.10 Waterstop XP is positioned in the centre of the reinforced concrete construction joint. It must be positioned in such a way as to ensure that a minimum of 75 mm concrete cover is provided to all sides of the waterstop.

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

Fixing mesh method (for construction joints)

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

Figure 2 Waterstop XP installation details



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

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

Adhesive method (for construction joints and service penetrations)

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

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

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

Swelling

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

Concrete casting

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

15 Repair

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

Technical Investigations

16 Tests

16.1 Tests were conducted on Ultraseal XP and Coretex XP, and the results assessed to determine:

- length, width, straightness and flatness
- thickness and mass per unit area
- resistance to liquid water
- tensile properties
- resistance to impact
- resistance to static loading
- ability to self-heal.

16.2 Tests were conducted on Waterstop XP, and the results assessed to determine:

- characteristics
- resistance to hydrostatic water pressure
- unrestrained swelling characteristics under alkali, neutral, saline and acidic water conditions
- effect of wet/dry cycles on swelling characteristics
- load developed when restrained.

16.3 Tests were conducted on Cetseal, and the results assessed to determine:

- product characteristics
- tensile bond strength.

16.4 Tests were conducted on Seal-X XP, and the results assessed to determine:

- product characteristics
- unrestrained swelling characteristics under alkali, neutral, saline and acidic water conditions
- effect of wet/dry cycles on swelling characteristics
- load developed when restrained
- resistance to hydrostatic water pressure.

17 Investigations

17.1 The manufacturing process was evaluated, including the methods for quality control, and details were obtained of the quality and composition of the materials used.

17.2 An assessment was made of existing data from independent laboratories relating to:

- static puncture resistance
- water vapour transmission.

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

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

Bibliography

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

BS EN 13491 : 2006 *Geosynthetic barriers — Characteristics required for use as a fluid barrier in the construction of tunnels and associated underground structures*

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

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

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

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

18.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

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