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BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

Designated by Government to issue European Technical Approvals

Phoenix Dichtungstechnik GmbH
Eisenacher Landstrasse 70
D-99880 Walterhausen
Germany
Tel: 00 49 40 7667 2809 Fax: 00 49 40 7667 2949
website: www.phoenix-dt.de

Agrément Certificate No 06/4329

RESITRIX ROOF WATERPROOFING SYSTEMS

Système d'étanchéité
Dachabdichtungen

Product

- *THIS CERTIFICATE RELATES TO RESITRIX ROOF WATERPROOFING SYSTEMS.*
- *The membranes are for use as waterproofing layers on:*
  - *mechanically fastened on flat and pitched roofs*
  - *fully or partially adhered on flat and pitched roofs*
  - *loose-laid and ballasted on flat roofs.*
- *Phoenix Dichtungstechnik GmbH's International Sales Department address is:*
  Rijnkaai 37
  200 Antwerpen
  Belgium
  Tel: 00 32 3 2067 428
  Fax: 00 32 3 2067 430
  e-mail: Phoenix.dt@phoenix.be

continued

Regulations

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

The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of roof waterproofing systems with the Building Regulations. In the opinion of the BBA, Resitrix Roof Waterproofing Systems if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement:	B4(2)	External fire spread
Comment:		Data obtained from tests to BS 476-3 : 2004 indicate that on suitable non-combustible substructures the use of the membranes will enable a roof to be unrestricted under this Requirement. See sections 11.1 to 11.3 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		Data for water resistance on the membranes, including joints, indicate that the systems meet this Requirement. See section 8.1 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The membranes are acceptable materials. See section 13 of this Certificate.

continued

- *The membranes are marketed in the United Kingdom by Contitech UK Ltd, Chestnut Field House, Chestnut Field, Rugby, Warwickshire CV21 2PA. Tel: 01788 571482 Fax: 01788 542245 e-mail: tony.brown@uk.Contitech.uk*
- *Installation must be carried out only by trained and approved contractors.*

2 The Building (Scotland) Regulations 2004

In the opinion of the BBA, Resitrix Roof Waterproofing Systems, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory Standards as listed below.

Regulation:	**8**	**Fitness and durability of materials and workmanship**
Regulation:	8(1)	Fitness and durability of materials and workmanship
Comment:		The membranes can contribute to a construction meeting this Regulation. See section 13 and the *Installation* part of this Certificate.
Regulation:	**9**	**Building standards — construction**
Standard:	2.8	Spread from neighbouring buildings
Comment:		Test data to BS 476-3 : 2004 indicate that on suitable non-combustible substructures the use of the membranes will be unrestricted by the requirements of this Standard, with reference to clause 2.8.1[(1)(2)]. See sections 11.1 to 11.3 of this Certificate.
Standard:	3.10	Precipitation
Comment:		Data examined for water resistance on the membranes, including joints, indicate that the use of the systems can enable a roof to satisfy the requirements of this Standard, with reference to clauses 3.10.1[(1)(2)] and 3.10.6[(1)(2)]. See section 8.1 of this Certificate.
Regulation:	**12**	**Building standards — conversions**
Comment:		All comments given for these systems 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).

3 The Building Regulations (Northern Ireland) 2000

In the opinion of the BBA, Resitrix Roof Waterproofing Systems, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	**B2**	Fitness of materials and workmanship
Comment:		The membranes are acceptable materials. See section 13 of this Certificate.
Regulation:	**C4**	Resistance to ground moisture and weather
Comment:		Data for water resistance on the membranes, including joints, indicate that the use of the systems can enable a roof to satisfy the requirements of this Regulation. See section 8.1 of this Certificate.
Regulation:	**E5**	External fire spread
Comment:		Test data to BS 476-3 : 2004 indicate that on suitable non-combustible substructures the use of the membranes will be unrestricted by the requirements of this Regulation. See sections 11.1 to 11.3 of this Certificate.

4 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: *5 Description* (5.2) and 6 *Delivery and site handling* (6.3).

Technical Specification

5 Description

5.1 Resitrix Roof Waterproofing Systems covered by this Certificate are:

- Resitrix Classic – a multi-laminate membrane consisting of a top layer of thermoplastic elastomer (TPE), a second layer of EPDM with a glass reinforcement, a third layer of TPE and a fourth layer of SBS-modified bitumen with a fine sand finish. For use in mechanical fastened, loose-laid and ballasted, partially adhered and fully adhered applications
- Resitrix MB — a multi-laminate membrane (as Resitrix Classic) with polyethylene separating film (instead of fine sand finish). For use in mechanically fastened, loose-laid and ballasted, partially adhered and fully adhered applications
- Resitrix SK — the top three layers are as for Resitrix Classic, the modified-bitumen layer is replaced with a self-adhesive, polymer-modified bitumen with a release film and 60 mm selvedge with a thermofusible polyethylene film for heat welding of the joint. For use in partially and fully bonded applications[1].

(1) Resitrix SK can also be used in green roofs, however, this application is not covered by the Certificate.

5.2 The membranes are manufactured to the nominal characteristics given in Table 1.

Table 1 Nominal characteristics

Characteristics (units)	membrane	
	Resitrix Classic/MB	Resitrix SK
Thickness (mm)	3.1	2.5
Length (m)	10	10
Width (m)[1]	1	1
Weight per unit	3.5	2.75
Roll weight (kg)	35.0	27.5

(1) Also available in widths of 250, 333, 500 and 666 mm.

5.3 Ancillary items for use with the membranes include:

- FG 35 Surface Primer — a synthetic rubber and resin, low viscosity, solvent-based primer, for use in priming all surfaces prior to application of Resitrix SK
- G 2000 Contact Adhesive — a medium-viscosity polychloroprene adhesive for use with Resitrix Classic for perimeter flashings
- G 500 Thinner — a blend of organic solvents for use in thinning G 2000, degreasing metal surfaces and cleaning tools/equipment
- PU-LMF-98 Polyurethane — a single component, polyurethane adhesive for use with Resitrix Classic on flat roof areas
- Resitrix patches — for use in producing corner details.

5.4 Quality control checks are carried out during production and on the final product. Checks on the final product include:

- thickness
- weight per unit area
- tensile properties
- dimensional stability
- foldability at low temperature
- joint strength
- watertightness
- heat ageing.

6 Delivery and site handling

6.1 The membranes are delivered to site in individually wrapped rolls on a pallet, 20 rolls per pallet. The wrapper bears the product name, dimensions, weight, production code and the BBA identification mark incorporating the number of this Certificate.

6.2 Rolls should be stored vertically on a clean, dry, level surface and kept under cover.

6.3 Ancillary items classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP3) are given in Table 2 along with flashpoints. These products bear the appropriate hazard warning.

Table 2 Flashpoint and hazard classification

Materials	Flashpoint (°C)	Classification
FG 35 Surface primer[1][2]	–20	highly flammable
G 2000 Contact Adhesive[1]	–4	highly flammable, irritant
G 500 Thinner[1][2]	–15	highly flammable, harmful
PU-LMF-98	212	harmful

(1) These components should be stored in accordance with the Highly Flammable Liquids and Petroleum Gases Regulations 1997.

(2) These components are harmful to aquatic organisms.

Design Data

7 General

7.1 Resitrix Classic and MB membranes, are satisfactory for use as, partially adhered or fully adhered mechanically-fixed waterproofing on flat and pitched roofs with limited access and loose-laid and ballasted on flat roofs with limited access.

7.2 The Resitrix SK membrane is satisfactory for use as partially or fully-adhered waterproofing on flat and pitched roofs with limited access.

7.3 Limited access roofs are defined for the purpose of this Certificate as those roofs subjected only to pedestrian traffic for maintenance of the roof covering and cleaning of gutters, etc. Where traffic in excess of this is envisaged, special precautions, such as additional protection to the membrane, must be taken.

7.4 Flat roofs are defined for the purpose of this Certificate as those roofs having a minimum finished fall of 1:80. For design purposes, twice the minimum finished fall should be assumed, unless a detailed analysis of the roof is available, including overall and local deflection, direction of falls, etc. Pitched roofs are defined for the purpose of this Certificate as those having a fall in excess of 1:6.

7.5 Decks to which the membranes are to be applied must comply with the relevant requirements of BS 6229 : 2003, BS 8217 : 2005 and, where appropriate, NHBC Standards, Chapter 7.1 or the *Zurich Building Guarantee Technical Manual,* Section 4 *Superstructure*, Sub-section *Flat roofs* (pages 266 and 268).

7.6 Insulation materials used in conjunction with the systems must be either:

- as described in BS 8217 : 2005, or
- the subject of a current BBA Certificate and be used in accordance with, and within the limitations of, that Certificate.

7.7 Installation must be carried out only by installers trained and approved by the marketing company.

8 Weathertightness

8.1 Test data confirm that the membranes, and joints in the membranes, when completely sealed and consolidated, will adequately resist the passage of moisture to the inside of the building and so meet the requirements of the national Building Regulations:

England and Wales

Approved Document C, Requirement C2(b), Section 6.0

Scotland

Mandatory Standard 3.10, clauses 3.10.1[(1)(2)] and 3.10.6[(1)(2)]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland

Regulation C4.

8.2 The systems are impervious to water and, when used as described will give a weathertight roof capable of accepting minor structural movement without damage.

9 Resistance to wind uplift

9.1 The resistance to wind uplift of a mechanically-fixed waterproofing layer is provided by the washer secured to the deck by approved fasteners passing through the membrane. The number and position of fixings will depend on many factors, including:

- wind uplift forces to be resisted
- pull-out strength of fasteners
- elastic limit of the membrane
- appropriate safety factors.

9.2 The number of fixings used should be established by reference to the wind uplift forces calculated in accordance with BS 6399-2 : 1997 on the basis of maximum permissible loads of 0.5 kN per fixing.

9.3 The precise ballast requirements for loose-laid systems should be calculated in accordance with the relevant parts of BS 6399-2 : 1997, but should be a minimum thickness of 50 mm. In areas of high-wind exposure the gravel may be bonded at the edges for a distance of one metre. Alternatively, concrete slabs on suitable supports can be used.

9.4 The adhesion of the partially and fully-adhered systems to the substrate will be limited by the cohesive strength of the substrate. Tests indicate that on substrates of high cohesive strength the adhesion of systems is sufficient to resist the effects of wind suction, thermal cycling or minor structural movements occurring in practice.

10 Resistance to foot traffic

Data indicate that the systems can accept, without damage, the limited foot traffic and light concentrated loads associated with the installation and maintenance operations. Reasonable care should be taken, however, to avoid sharp objects or concentrated loads. Anywhere regular traffic is envisaged, ie maintenance of lift equipment, a walkway should be provided using concrete slabs supported on bearing pads.

11 Properties in relation to fire

11.1 When tested in accordance with BS 476-3 : 2004 a system comprising:

- an 18 mm thick primed marine plywood substrate, a self-adhesive bitumen/aluminium vapour control layer, an 80 mm thick polyisocyanurate insulation board and a layer of Resitrix MB mechanically fastened, achieved a rating of EXT.F.AB
- an 18 mm thick primed marine plywood substrate, a self-adhesive bitumen/aluminium vapour control layer, an 80 mm thick, mechanically fastened, primed polyisocyanurate insulation board and a layer of Resitrix SK fully bonded achieved a rating of EXT.F.AB.

11.2 The membrane used in the loose-laid and ballasted specification, including a minimum depth of 50 mm of aggregate, shall be deemed to satisfy BS 476-3 : 2004 rating EXT.F.AA.

11.3 The designation of other specifications (eg on combustible substrates) should be confirmed by:

England and Wales

Test or assessment in accordance with Approved Document B, Appendix A, Clause 1

Scotland

Test to conform with Mandatory Standard 2.8, clause 2.8.1[1][2]

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland

Test or assessment by a UKAS accredited laboratory or an independent consultant with appropriate experience.

12 Maintenance

12.1 Roofs covered with the systems should be the subject of annual inspections, as is good practice with single-layer waterproofing systems, to ensure continued security and performance, especially those roofs without ballast.

12.2 In the event of accidental damage, repairs can be carried out by cleaning the area around the damage and applying a patch as described in the Certificate holder's instructions.

13 Durability

The products have been used in Europe since 1981 and have performed satisfactorily. Accelerated weathering tests and evidence from long-term existing sites confirm that satisfactory retention of physical properties is achieved. Available evidence indicates that the system should have a life in excess of 30 years.

Installation

14 General

14.1 Installation of Resitrix Roof Waterproofing Systems must be carried out by trained and approved installers working in accordance with the relevant clauses of the Certificate holder's instructions and BS 8000-4 : 1989.

14.2 Conditions on site should be those for normal roof waterproofing work. Deck surfaces must be dry, clean and free from sharp projections such as nail heads, concrete nibs. When used over a rough substrate, a suitable protection layer should be placed over the substrate.

14.3 Installation should not be carried out during wet weather (eg rain, fog, snow) nor when the temperature is below 5°C unless suitable precautions against surface condensation are taken.

14.4 All flashings should be formed in accordance with the Certificate holder's instructions.

15 Procedure

Mechanically fastened (MB and Classic)

15.1 The membrane should be laid out flat onto the substrate without folds or ripples, with 100 mm overlaps (130 mm wide over polystyrene insulation).

15.2 The membrane is mechanically fixed to the deck (through the insulation boards, where appropriate) in the joint overlaps, prior to welding of the joint. The joint must be welded prior to the installation of the next line of fasteners on the other side of the sheet to avoid creasing of the membrane.

15.3 The fastener washers should be positioned a minimum of 10 mm from the edge of the membrane. The fixings should be installed at centres calculated from the average wind force for that area, with a maximum of 330 mm centres and a minimum of 200 mm centres, (see sections 9.1 and 9.2).

Loose-laid and ballasted (MB and Classic)

15.4 The membrane should be laid out flat onto the substrate without folds or ripples, with 50 mm overlaps (80 mm wide over polystyrene insulation).

15.5 At roof perimeters the membrane should be installed with minimum upstands of 50 mm. Details and perimeters should be either mechanically fastened or fully adhered.

15.6 The membrane should be covered with a protective sheet prior to the application of a 50 mm minimum thick layer of washed, well-rounded gravel (between 16 mm and 32 mm in diameter). In areas of high-wind exposure, a heavier gravel may be used and/or the gravel may be bonded at the edges for a distance of one metre. Alternatively, concrete slabs on suitable supports (preferably 10 mm thick rubber supports) can be used.

Fully adhered (MB and Classic)

15.7 Fully adhering the systems can be achieved by either softening or pour and roll bonding in bitumen.

Softening

15.8 The substrate should be a new or existing bitumous layer and must contain 1 kgm^{-2} of bitumen above the reinforcement, if less, additional bitumen should be applied to achieve this figure.

15.9 The membrane should be laid out flat onto the substrate without folds or ripples, with 50 mm overlaps.

15.10 Each end of the membrane is rolled back to the centre of the roll.

15.11 Before the membrane is rolled out, the bituminous underlayer is heated until it melts using a gas torch, the membrane is then rolled out over the molten bitumen. Care must be taken to ensure

flames do not contact with the roll and in particular with the EPDM top layer.

Pour and roll

15.12 The bonding is carried out as for traditional bitumen roofing using 95/25 or 115/15 grade oxidised bitumen. The laps are 50 mm wide and must be kept free of bitumen.

Self-adhesive application (SK)

Partially bonded

15.13 The substrate is primed using FG 35 Surface Primer at a rate of 100% coverage for a one-metre-wide band around roof perimeter and 30% coverage rate in the central zone of the roof.

15.14 When the primer is dry (a minimum of 60 minutes), the membrane should be laid out flat onto the substrate without folds or ripples, with 50 mm overlaps.

15.15 The membrane is either rolled or folded back to the centre of the membrane and the release film is carefully scored with a knife along the centreline and removed.

15.16 The membrane is applied to the substrate, pressed down ensuring a good bond between membrane and substrate. The operation is repeated for the other half of the sheet.

Fully bonded

15.17 The substrate is primed using FG 35 Surface Primer at a 100% coverage rate.

15.18 The membrane is installed as described in sections 15.14 to 15.16.

Joints

15.19 The joints are formed by heat welding in accordance with the Certificate holder's installation instructions.

Detailing

15.20 Details are formed in accordance with the Certificate holder's installation instructions. Corner details should be reinforced using Resitrix patches.

Technical Investigations

The following is a summary of technical investigations carried out on Resitrix Roof Waterproofing Systems.

16 Tests

16.1 Data from tests conducted by the BBA, CSTC/WTCB/BBRI and BDA are summarised in Tables 3 and 4.

Table 3 Physical properties of Resitrix MB/Resitrix Classic — directional

Test (units)	Method[1]	Mean results	
		long[2]	trans[3]
Tensile strength (N per 50 mm)	EN 12311-2 (100 mm min^{-1})		
control		411	348
heat aged[4]		383	334
Elongation at break (%)	EN 12311-2 (100 mm min^{-1})		
control		680	638
heat aged[4]		547	564
Nail tear (N)	EN 12310-1 (100 mm min^{-1})	360	468
Dimensional stability (%)	EN 1107-2	–0.05	0.00

(1) The test documents are detailed in the *Bibliography*.

(2) Longitudinal direction.

(3) Transverse direction.

(4) Heat aged 28 days at 80°C.

Table 4 Physical properties of Resitrix SK — directional

Test (units)	Method[1]	Mean results	
		long[2]	trans[3]
Tensile strength (N per 50 mm)	EN 12311-2 (100 mm min^{-1})		
control		683	630
heat aged[4]		580	672
Elongation at break %	EN 12311-2 (100 mm min^{-1})		
control		609	623
heat aged[4]		269	522
Cold folding temperature (°C)	EN 495-5	⩽–35	⩽–35
Nail tear (N)	EN 12310-1 (100 mm min^{-1})	312	287

(1) The test documents are detailed in the *Bibliography*.

(2) Longitudinal direction.

(3) Transverse direction.

(4) Heat aged 168 days at 70°C.

Table 5 Service performance

Test (units)	Method[1]	Mean results	
		MB/Classic	SK
Water vapour permeability (gm^{-2} day^{-1})	BS 3177 (25°C/75% RH)	0.243	0.310
Vapour resistance ($MNsg^{-1}$)	BS 3177 (25°C/RH 75%)	844	662
Static indentation	MOAT 66 : 4.3.8		
EPS		—	L_{10}
concrete		—	L_{20}
Dynamic impact	MOAT 66 : 4.3.9		
EPS		—	I_{10}
perlite		—	I_{10}
Fatigue cycling	MOAT 66 : 4.3.7	—	pass
Peel strength	MOAT 66 : 4.3.3		
control			
concrete		100	214
plywood		150	—
Heat aged[2]			
concrete		74	115
plywood		141	—
Wind uplift (N per fastener) failure load	ETAG 006		
Isofast		1000	—
Ejot		900	—
Correct load			
Isofast		633	—
Ejot		570	—
Wind uplift on partially adhered (kPa)	MOAT 66 : 4.3.2	—	⩾8[3]

(1) The test documents are detailed in the *Bibliography*.

(2) Heat at aged 28 days 80°C

(3) No failure of sample, test stopped after 8 kPa cycle.

— not tested.

16.2 Testing was also carried out on the membranes to determine:

- thickness
- width
- length
- mass per unit area
- straightness
- flatness.

17 Investigations

17.1 Existing data on fire performance to BS 476-3 : 2004 were examined.

17.2 The manufacturing processes were examined, including methods of quality control. Details were also obtained of the quality and composition of the materials used.

Bibliography

BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*

BS 3177 : 1959 *Method for determining the permeability to water vapour of flexible sheet materials used for packaging*

BS 6229 : 2003 *Code of practice for flat roofs with continuously supported coverings*

BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*

BS 8000-4 : 1989 *Workmanship on building sites — Code of practice for waterproofing*

BS 8217 : 2005 *Code of practice for built-up felt roofing*

EN 495-5 : 2001 *Flexible sheets for waterproofing — Determination of foldability at low temperature — Plastic and rubbers sheets for roof waterproofing*

EN 1107-2 : 2001 *Flexible sheets for waterproofing — Determination of dimension stability — Plastic and rubber sheets for roof waterproofing*

EN 12310-1 : 2000 *Flexible sheets for waterproofing — Determination of resistance to tearing (nail shank)— Part 1 — Bitumen sheets for roof waterproofing*

EN 12311-2 : 2000 *Flexible sheets for waterproofing — Determination of tensile properties — Part 2 — Plastic and rubber sheets for roof waterproofing*

MOAT No 66 : 2001 *UEAtc Technical guide for the assessment of non-reinforced, reinforced and/or backed roof waterproofing systems made of EPDM*

ETAG 006 : 2000 *Systems of Mechanically Fastened Flexible Roof Waterproofing Membranes*

Conditions of Certification

18 Conditions

18.1 This Certificate:

- relates only to the product/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.

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

18.3 This Certificate will remain valid for an unlimited period provided that the product/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.

18.4 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 product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product or system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

18.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 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 or in the future; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any present or future 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 product/system.

BBA BRITISH BOARD OF AGRÉMENT
TECHNICAL APPROVALS FOR CONSTRUCTION

In the opinion of the British Board of Agrément, Resitrix Roof Waterproofing Systems are fit for their intended use provided they are installed, used and maintained as set out in this Certificate. Certificate No 06/4329 is accordingly awarded to Phoenix Dichtungstechnik GmbH.

On behalf of the British Board of Agrément

Date of issue: 27th July 2006

Chief Executive

British Board of Agrément
P O Box No 195, Bucknalls Lane
Garston, Watford, Herts WD25 9BA
Fax: 01923 665301

e-mail: mail@bba.star.co.uk
website: www.bbacerts.co.uk

For technical or additional information, contact the Certificate holder (see front page).
For information about the Agrément Certificate, including validity and scope, tel: Hotline 01923 665400, or check the BBA website.