



Protecting Infrastructure Assets

Innovative Waterproofing for Bridges & Tunnels



PITCHMASTIC PmB

www.pitchmasticpmb.com

About

Pitchmastic PmB International are part of the RPM Group of companies a \$5 billion construction materials conglomerate.

We are at the forefront of technological developments in the world of structural waterproofing and were established over 70 years ago with a commitment to developing new and more effective ways of waterproofing structures.

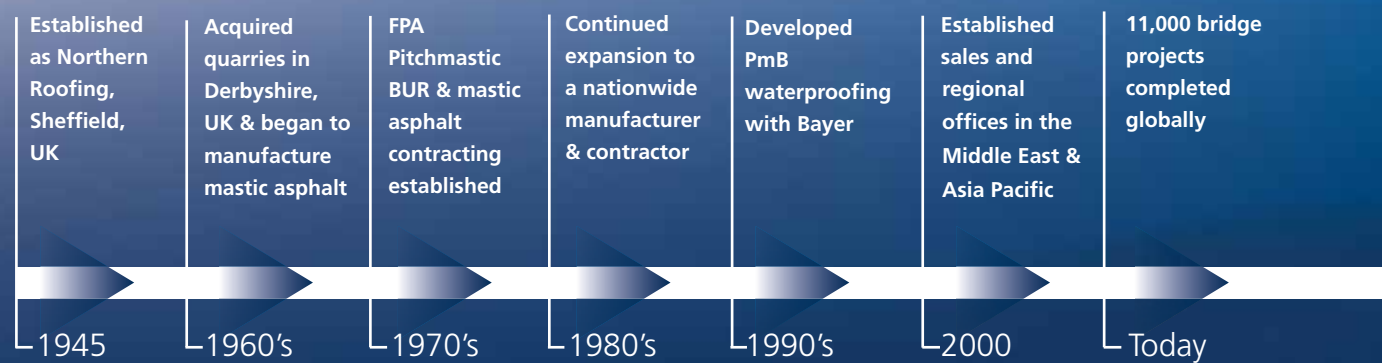
Pitchmastic PmB International has established local applicator partnerships in Europe, Middle East, America, Africa and APAC.

Over 12,000,000m² of PmB has been applied to structures globally including 11,000 bridges.

Our markets



Evolution of the Brand



Why Waterproof Structures?

The Effects Of Structural Corrosion

- Constant repair & maintenance
- Reduction in the service life of structures
- High cost of remediation
- Operational shut down cost caused by water ingress & repairs

Key Engineering Considerations

- **Crack Bridging**
 - New cracks require infinite elongation
 - Tensile strength
 - Bond to substrate
- **Typical Design Life**
 - 120 years
 - Non-degradable
 - Durable & robust
- **Resistance To Chemicals & Chlorides**

Key Design Considerations



Resistance To Abrasion



Crack Bridging



Rapid Installation



Weather Resistance



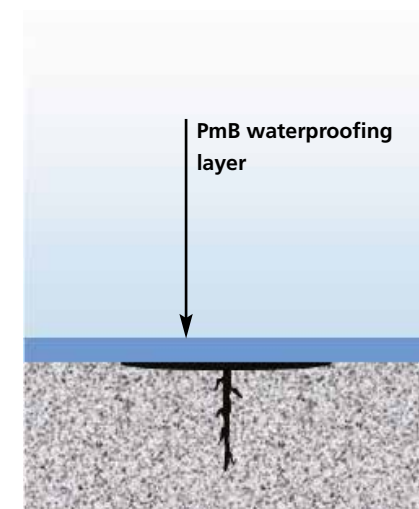
Adhesion



Resistance To Fire



Water Tightness

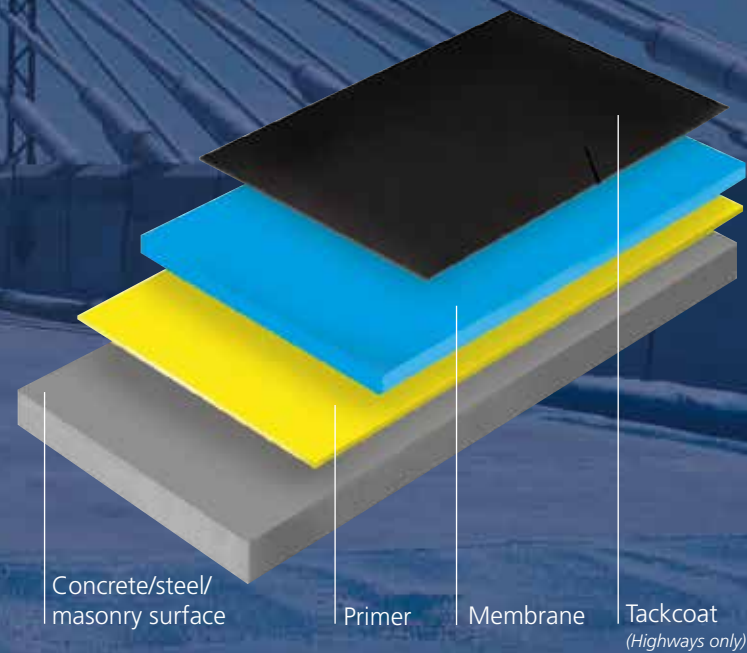


Choosing The Right Specification

UK History of Bridge Deck Waterproofing Policy

- 1945** | Ministry of Transportation stipulate waterproofing as being beneficial to bridge stock
- 1960** | Waterproofing concrete bridges becomes mandatory
- 1975** | UK National standard BE27 Introduced for concrete bridge deck waterproofing requiring BBA testing and certification
- 1986** | UK DoT Appoints TRL to carry out study after premature failures causing issues with existing bridge stock
- 1987** | TRL study defective systems and **-1989** | recommend improvements in specifications
- 1994** | Introduction of BD47 standard to replace BE27 improving performance criteria
- 1999** | Formal introduction of BD47 to UK market is made mandatory. DoT reduced systems approved from twenty five under BE27 to two approved in UK. Only liquid spray systems that meet BD47 and HAPAS used in the UK
- 2007** | IAN 96/07 published surfacing and tack coat guidelines
- 2010** | HAPAS provides additional testing to enhance performance and products
- 2011** | Installer accreditation BDWA led scheme to ensure all applicators are fully trained
- 2016** | European Standard ETA for Liquid applied systems

The System



What is PmB?

- Two component PUR spray system
- 100% solids reactive resin content
- Solvent free
- No fillers / extender loading
- Rapid setting – 5-8 seconds gel time
- Tack free after approximately 1 minute
- Can be walked on after approximately 10 minutes
- Elastic after approximately 45 minutes

Spray Applied, Seamless Bridge Deck Waterproofing

PmB forms a flexible, chemically resistant seamless membrane tough enough to outlast the design of many structures. PmB has exceptional bond strength to all commonly used substrates, has excellent crack bridging capability, a life expectancy in excess of 30 years and holds British Board of Agrément approval. Tested and approved throughout the world to the highest standards, the PmB system now adds Network Rail and London Underground (LUL) approvals to its ever growing list of accreditations.

System Benefits:

- Spray applied - rapid curing
- Excellent global track record
- Seamless membrane
- Excellent crack bridging properties
- Quality assured - including pin hole survey
- Durable, corrosion protection waterproofing
- BBA / HAPAS certified
- Longevity in service life

Applications:

- Bridges
- Footbridges
- Culverts
- Tunnels
- Walkways

History – PmB

- 1966** | Baytec Elastomer Developed by Bayer AG
- 1967** | PmB first applied to pipelines and marine applications
- 1970** | PmB first applied to bridge deck and swimming pools
- 1975** | Application of PmB to bridges and tunnels
- 1986** | Pitchmastic UK developed PmB with Bayer based upon Baytec technology
- 1994** | Signed global agreement with Bayer
- 1995** | First applications in GCC and APAC
- 1996** | Second Severn Crossing - Largest Bridge in the UK at the time!
- 2000** | Dubai International Airport, UAE waterproofed using PmB
- 2001** | Structures protected in Republic of Ireland with PmB for the first time
- 2005** | Palm Jumeriah Gateway and Crescent Bridge, UAE
- 2010** | Sheikh Zayed Bridge, UAE completed
- 2012** | Marina Coastal Expressway, Singapore C485 Completed
- 2014** | Danube Bridge, Bulgaria completed
- 2016** | Completed RA166 and RA167 Projects in Kuwait totaling 520,000m²
- 2018** | Completed Doha Link, Kuwait one of the largest structures of it's kind in the Middle East totaling 13.7km long
- 2019** | Over 11,000 bridge projects completed globally



Dr. Otto Bayer of Bayer Group invented Polyurethane in **1937**



Bayer Group developed an Elastomeric Polyurethane system (Baytec) in **1966**.



Installation Process



Pre Installation Checks

Surface Preparation

- No system will perform if preparation is not carried out satisfactorily
- Clean, dry and free of contamination

Primer

Applied by airless spray or roller

Membrane

- PmB two part Polyurethane spray applied elastomer
- Installed using computerised two component spray machines

Spray Technology

- Versatile to suit access, application area and clients programmes and productivity requirements

QA/QC Application



PmB Sanded Key Layer



Application Layer

Tackcoat

- Polymer modified
- 95°C Softening point Bitumen emulsion
- Applied by squeegee over sanded key layer

Sanded Key Application Layer

1. Primer PMCS/01
 2. 1-3mm Silica sand
- Provides enhanced bonding to overlay layer

Application QA/QC – Pinhole Check

QA/QC Quality Testing

QA/QC Quality Thickness

HAPAS
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BBA APPROVAL INSPECTION TESTING CERTIFICATION
HAPAS Certificate 10/H164 Product Sheet 1

PITCHMASTIC BRIDGE DECK WATERPROOFING SYSTEM
PmB BRIDGE DECK WATERPROOFING SYSTEM

This HAPAS Certificate Product Sheet is issued by the British Board of Agrément (BBA), supported by Highways England (HE) (acting on behalf of the Operating Organisations of the Department for Transport, Transport Scotland, the Welsh Assembly Government and the Department for Regional Development, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Social Government Technical Advisors Group and industry bodies. HAPAS Certificates are normally each subject to a review every three years. (1) Wherever referred to as 'Certificate'.

This Certificate relates to the PmB Bridge Deck Waterproofing System for use as a waterproofing system for concrete decks of highway bridges.

CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal bi-yearly review

KEY FACTORS ASSESSED

Performance — the system meets the requirements of the Guidelines Document for the Assessment and Certification of Waterproofing Systems for Use on Concrete Decks of Highway Bridges (see section 3)

Durability — provided the installed system is not damaged during subsequent resurfacing, it will provide an effective waterproof layer to the concrete bridge deck (see section 8)

The BBA has awarded this 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 Second issue: 6 April 2016
Originally certified on 23 September 2010

Simon Wroe
Head of Approvals — Engineering

Claire Curtis-Thomas
Chief Executive

The BBA is a UKAS accredited certification body — Number 173. The schedule of Assessment scope of accreditation for product certification is available in pdf format for the UKAS list on the BBA website at www.bbacentr.co.uk

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Global Approvals

- Abu Dhabi DOT
- ADA Saudi Arabia
- Al Ain Municipality
- Dubai RTA
- Lusail Development, Qatar
- Ashghal, Qatar
- Muscat Municipality and MOTC
- Kingdom of Bahrain Roads and Housing
- Qatar Petroleum
- Kuwait MPW
- Department of Transport BD47/99, BBA HAPAS UK
- LSETR Cert RAT 9359 Finland
- BAM Institute ZTV-BEL B3/87 Germany
- LTA Singapore
- EMPA Cert 4944-1-2-3 Switzerland
- THSR Specification 07140 Taiwan
- New Jersey Rail, New York DOT
- MASS DOT Highways, USA



Cradle to Grave Strategy

We liaise closely and offer technical support and site assistance to all commercial clients, consultants & main contractors – we stay involved through the whole life cycle of the project.

1st	Technical support and consultancy	5th	Supply and install solution provider
2nd	Formulator & manufactured solutions	6th	Quality control & guarantee
3rd	Comprehensive quotation specialist sub-contractor	7th	Project completion & financial closure
4th	Expert local knowledge and labour resource	8th	Repeat business & recommendations

Project Case Studies

CP3, A Lusail Qatar

25,000m² of PmB waterproofing applied to bridge deck & underpass of this super structure.



Doha Link, Kuwait

Supply and installation of 280,000m² PmB structural waterproofing.



New Spire Bridge, UK

9,000m² of PmB waterproofing was applied to the concrete bridge deck.



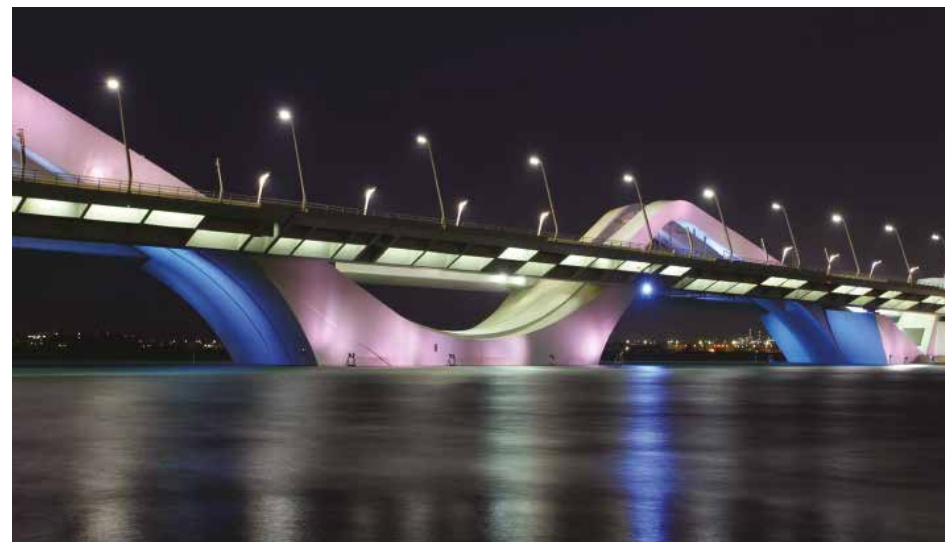
King Abdullah Aziz Flyover, Riyadh, KSA

31,500m² of PmB structural waterproofing was applied to the main steel deck and approach bridges.



Second Severn River Crossing, UK

Application of 176,000m² of PmB spray applied waterproofing.



Sheikh Zayed Bridge, UAE

58,000m² of PmB waterproofing applied to this prestigious bridge.



Tinsley Viaduct, UK

8,400m² of PmB structural waterproofing, aggregated key coat and hot melt applied to bridge deck.
2,000m² combined waterproofing and high friction surfacing was applied to the steel walkway plates

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