

SBC TECHNICAL DATA SHEET

THERMO SHIELD® AQUA IR 2K

Two-Component Water-Based Infrared Reflective (IR) Acrylic–Polyurethane Protective Coating

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1. PRODUCT DESCRIPTION

THERMO SHIELD® AQUA IR 2K is an advanced two-component, water-based acrylic–polyurethane coating system developed for the long-term protection of interior and exterior surfaces exposed to high mechanical and environmental loads.

The coating incorporates specially formulated infrared-reflective pigments together with UV absorbers and light stabilisers, contributing to reduced solar heat gain, improved colour stability and extended coating durability.

Laboratory testing has confirmed the coating's high infrared reflectance, favourable Total Solar Reflectance (TSR) values, as well as excellent abrasion resistance and adhesion performance.

When applied to properly prepared substrates, the system is suitable for concrete, asphalt, cement-based materials, timber and other mineral surfaces. When used in combination with an appropriate primer system, it is also suitable for steel and other metallic substrates.

Its combination of mechanical durability, weather resistance and infrared reflective performance makes the coating suitable for demanding industrial, transport infrastructure and energy-related applications.

2. KEY BENEFITS

- Two-component chemically curing coating system
- Water-based technology
- High UV resistance
- Infrared (IR/NIR) reflective pigment technology
- High Total Solar Reflectance (TSR)
- Excellent IR Solar Reflectance (IR-SR)
- High mechanical strength
- Excellent abrasion resistance
- Excellent adhesion when used with suitable primer systems

- Good weathering resistance
 - Good chemical resistance
 - Suitable for demanding exterior applications
 - Available in matt and customised finishes
 - Can be manufactured in standard RAL colours or customised colour shades
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3. APPLICATIONS

THERMO SHIELD® AQUA IR 2K is recommended for use on:

- Industrial floors
 - Traffic surfaces
 - Road marking systems
 - Concrete structures
 - Asphalt pavements
 - Roof surfaces
 - Car parks
 - Logistics centres
 - Warehouses
 - Industrial facilities
 - Energy infrastructure
 - Transport infrastructure
 - Exterior structures
 - Primed steel and galvanised steel substrates
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4. OPERATING PRINCIPLE

The coating combines two complementary performance mechanisms.

Firstly, the specially engineered infrared-reflective pigment system reflects a significant proportion of near-infrared solar radiation (700–2500 nm), thereby reducing solar heat absorption and limiting surface temperature increase.

Laboratory measurements demonstrate significantly higher Total Solar Reflectance (TSR) and Infrared Solar Reflectance (IR-SR) values compared with conventional grey reference coatings.

Secondly, the chemically curing acrylic–polyisocyanate binder system forms a dense, highly durable coating providing excellent abrasion resistance, weather resistance and long-term mechanical performance.

The incorporation of UV absorbers and light stabilisers further reduces the effects of ultraviolet radiation, helping to delay coating degradation and colour fading during long-term outdoor exposure.

5. TYPICAL APPLICATIONS

The coating system is particularly suitable for applications requiring:

- Long-term weather resistance
- High mechanical durability
- Excellent abrasion resistance
- Reduced surface heat build-up
- Long-term UV protection

Typical applications include:

- Road pavements
- Pedestrian walkways
- Industrial traffic routes
- Logistics facilities
- Parking areas
- Warehouses
- Utility infrastructure
- Industrial flooring
- Service areas surrounding photovoltaic installations
- Exterior structures exposed to elevated solar heat loads

6. TECHNICAL DATA

6.1 Product Type

Property	Value
Product Type	Two-component water-based acrylic–polyurethane coating system
Binder System	Reactive acrylic resin and water-emulsifiable aliphatic polyisocyanate
Curing Mechanism	Chemical cross-linking
Finish	Matt or customised finish
Intended Use	Interior and exterior applications

6.2 Suitable Substrates

Following appropriate surface preparation, THERMO SHIELD® AQUA IR 2K may be applied to:

- Concrete
- Reinforced concrete
- Cement-based substrates
- Asphalt
- Slate
- Timber
- Steel (when used with a suitable primer)
- Galvanised steel
- Aluminium
- Other structurally sound mineral substrates

6.3 Available Colours

THERMO SHIELD® AQUA IR 2K is available in:

- White
- Light Grey
- Dark Grey
- Custom RAL colours
- Customer-specific colour shades upon request

Due to the use of infrared-reflective pigments, the Total Solar Reflectance (TSR) and Infrared Solar Reflectance (IR-SR) values may vary depending on the selected colour.

7. PHYSICAL PROPERTIES

Component A

Property	Value
Appearance	Homogeneous pigmented suspension
pH	8.2–8.5
Non-Volatile Content	≥ 50 %
Particle Size	≤ 5 µm
Density	1.01–1.30 g/cm ³

Component B

Property	Value
Appearance	Slightly yellowish transparent liquid
Non-Volatile Content	Approx. 70 %
Density	1.12 g/cm ³
Flow Time (DIN 4, 20 °C)	≥ 70 s

8. MIXING RATIO

THERMO SHIELD® AQUA IR 2K is supplied as a two-component coating system.

The individual components shall only be mixed immediately before application.

Recommended mixing ratio (by weight):

Component A : Component B = 5 : 1

Mix thoroughly using a low-speed mechanical mixer until a completely homogeneous mixture is obtained.

Avoid excessive air entrapment during mixing.

The mixed material shall be applied within the specified pot life.

9. LABORATORY TESTING

THERMO SHIELD® AQUA IR 2K has been subjected to an extensive laboratory testing programme to verify its performance under representative service conditions.

The available test reports include:

- Infrared Reflectance
- Total Solar Reflectance (TSR)
- Infrared Solar Reflectance (IR-SR)
- Accelerated UV Weathering
- Taber Abrasion Resistance
- Adhesion Strength
- Slip Resistance
- Anti-Graffiti Performance

Several coating colours and coating system configurations were evaluated during the testing programme.

10. INFRARED REFLECTANCE

The spectral reflectance of the coatings was determined using a **Surface Optics SOC 410 Solar Spectrum Reflectometer**.

Measurement wavelength range:

335–2500 nm

The infrared-reflective coating variants exhibited significantly higher solar reflectance than conventional grey reference coatings.

Typical Total Solar Reflectance (TSR)

Colour	TSR
White IR UV	0.822
Light Grey IR UV	0.570
Dark Grey IR UV	0.508
Conventional RAL 7001	0.252

Typical Infrared Solar Reflectance (IR-SR)

Colour	IR-SR
White IR UV	0.778
Light Grey IR UV	0.657
Dark Grey IR UV	0.615
Conventional RAL 7001	0.251

The laboratory measurements demonstrate that the infrared-reflective coating system provides substantially higher solar reflectance than conventional grey coatings, particularly within the near-infrared wavelength range responsible for the majority of solar heat gain.

11. THERMAL PERFORMANCE

The high Total Solar Reflectance (TSR) and Infrared Solar Reflectance (IR-SR) values contribute to:

- Reduced surface temperatures under solar exposure
- Lower solar heat gain
- Reduced thermal stress within coated structures
- Improved long-term durability of exterior coating systems

Development testing indicates that, under favourable environmental conditions, infrared-reflective coating systems may reduce surface temperatures by up to **10–15 °C** compared with conventional coatings.

The actual temperature reduction depends on several factors, including:

- Coating colour
- Solar radiation intensity
- Surface orientation
- Ambient weather conditions
- Substrate characteristics

12. UV RESISTANCE

The UV resistance of THERMO SHIELD® AQUA IR 2K was evaluated by accelerated weathering in accordance with **MSZ EN ISO 11507:2007**.

Test Conditions

Parameter	Value
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Standard	MSZ EN ISO 11507:2007
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Test Equipment	Q-Lab QUV/SE
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UV Light Source	UV-B 313
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Irradiance	0.68 W/m ²
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Test Objective	Evaluation of colour and gloss stability
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During the test programme, colour change (ΔE) and gloss retention were measured in comparison with the original reference panels.

Test Results

The laboratory evaluation demonstrated that:

- no cracking occurred;
- no blistering was observed;
- no delamination occurred;
- the coating retained its structural integrity throughout the test;
- weathering progressed gradually and uniformly.

Although colour variation increased progressively during exposure, the protective performance of the coating remained essentially unchanged.

Performance Evaluation

Development testing indicates that the coating system maintained satisfactory performance after more than **2,500 hours** of accelerated UV exposure, demonstrating excellent long-term resistance to outdoor weathering.

13. ABRASION RESISTANCE

Abrasion resistance was determined in accordance with **MSZ EN ISO 7784-2** using the Taber Abraser method.

Test Conditions

Parameter	Value
Standard	MSZ EN ISO 7784-2
Test Equipment	Taber Abraser 5155
Rotation Speed	60 rpm
Vacuum Extraction	70 %
Abrasive Wheels	CS10 / CS17
Applied Load	500 g / 1000 g

Average Taber Wear Index

Coating	CS10 500 g	CS17 500 g	CS17 1000 g
White IR UV	25.63	36.24	62.49
Light Grey IR UV	27.05	39.26	67.52
Dark Grey IR UV	41.65	44.07	61.06

Performance Evaluation

The coating system demonstrated excellent abrasion resistance under all test conditions. Even under the most severe test configuration (CS17 abrasive wheel, 1000 g load), the coating maintained favourable wear characteristics after **1,000 abrasion cycles**, confirming its suitability for heavily trafficked industrial and infrastructure applications.

14. ADHESION PROPERTIES

Adhesion performance was evaluated using both pull-off and cross-cut methods.

Pull-Off Adhesion

Standard: MSZ EN ISO 4624:2023

Test Equipment: Elcometer F510-20S

Dolly Diameter: 20 mm

Adhesive: LOCTITE EA 3455

Loading Rate: 0.70 N/mm²/s

Test Results

Measurement Adhesion Strength (N/mm²)

1	4.22
2	3.75
3	3.20
4	3.31
5	3.56

Average Adhesion Strength: ≈ 3.6 N/mm²

Cross-Cut Adhesion

Standard: EN ISO 2409

Classification: GT 0

The GT 0 classification represents the highest adhesion rating according to EN ISO 2409. No coating detachment was observed during testing.

15. MECHANICAL PERFORMANCE

Laboratory testing confirms that THERMO SHIELD® AQUA IR 2K provides:

- Excellent abrasion resistance
- Excellent adhesion when applied over suitable primer systems
- High resistance to ultraviolet radiation
- Excellent weather resistance for exterior applications
- Good chemical resistance
- High mechanical durability for industrial service conditions

The chemically cross-linking acrylic–polyurethane binder system forms a dense and durable protective film capable of withstanding repeated mechanical loading together with prolonged exposure to ultraviolet radiation and outdoor weathering.

16. SURFACE PREPARATION

The long-term performance of the coating system depends largely on proper surface preparation.

Before application, all substrates shall be clean, dry, structurally sound and free from dust, oil, grease, laitance, salts, curing compounds and any other contaminants that may adversely affect adhesion.

Inadequate surface preparation may significantly reduce adhesion, service life and the overall performance of the coating system.

Recommended Surface Preparation

Substrate	Recommended Preparation
Steel	Degreasing, removal of corrosion products, abrasive blasting where required
Galvanised Steel	Degreasing, light sweep blasting or mechanical abrasion, appropriate pre-treatment
Aluminium	Degreasing followed by light abrasion or chromate-free surface treatment
Concrete	Removal of dust and laitance, repair of defects, ensure complete curing and dryness
Asphalt	Thorough cleaning, removal of dust, oil and bituminous contaminants
Timber	Sanding, dust removal and, where appropriate, preservative treatment

Where previously coated substrates are involved, a compatibility test and trial application are recommended before full-scale application.

17. RECOMMENDED PRIMER SYSTEMS

For optimum adhesion and corrosion protection, the use of a suitable primer system is recommended.

Recommended primers include:

- CATEPOX® KM
- KATESIL® SIL
- Other compatible two-component epoxy anti-corrosion primers

CATEPOX® KM is a two-component epoxy-polyamide primer providing excellent corrosion protection, high mechanical strength and outstanding adhesion to steel substrates.

Selection of the primer shall be based on the substrate type, environmental exposure and service conditions.

18. MATERIAL PREPARATION

The individual components shall be mixed immediately prior to application.

Mixing Ratio

Component A : Component B = 5 : 1 (by weight)

Mix both components using a low-speed mechanical mixer for approximately **2–3 minutes** until a completely homogeneous material is obtained.

Avoid excessive air incorporation during mixing.

The mixed material shall be used within its specified pot life.

Do not dilute unless specifically recommended by the manufacturer.

19. APPLICATION METHODS

THERMO SHIELD® AQUA IR 2K may be applied by:

- Airless spray
- Conventional spray equipment
- Roller
- Brush

For large surface areas, **airless spray application** is recommended to achieve optimum film uniformity and productivity.

Application equipment shall be selected according to substrate geometry, required dry film thickness and project-specific conditions.

20. RECOMMENDED APPLICATION CONDITIONS

Parameter	Recommended Value
Ambient Temperature	+10 °C to +35 °C
Substrate Temperature	Minimum +10 °C
Relative Humidity	≤ 80 %
Dew Point	Minimum 3 °C above the dew point

Application shall not be carried out when condensation is likely to occur or during rainfall.

For applications at temperatures above **25 °C** or relative humidity below **50 %**, the use of the slower-reacting **B003 Hardener** is recommended for large-area applications in order to maintain adequate working time and application quality.

Application Notes

- Protect freshly applied coatings from rain, condensation and contamination until fully cured.
- Ensure adequate ventilation during both application and curing.

- Apply only to properly prepared substrates.
- Always verify substrate moisture content where applicable.
- Carry out a trial application whenever substrate compatibility is uncertain.

21. DRYING AND CURING TIMES

Drying and curing times depend on several factors, including:

- Ambient temperature
- Relative humidity
- Applied film thickness
- Air circulation

Typical values under standard conditions ($23 \pm 2^\circ\text{C}$, $50 \pm 5\% \text{ RH}$) are shown below.

Property	Typical Value
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Dust Dry	Several hours
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Recoatable In accordance with the manufacturer's recommended overcoating interval

Full Cure	Several days
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Higher temperatures accelerate the curing process, while lower temperatures and higher humidity may significantly extend curing times.

22. THEORETICAL CONSUMPTION

Material consumption depends on:

- Surface profile and roughness
- Application method
- Specified dry film thickness (DFT)
- Absorbency and condition of the substrate

The actual consumption may vary according to site conditions.

For large-scale projects, a trial application is recommended to determine the actual material requirement under practical conditions.

23. MAINTENANCE

Under normal service conditions, THERMO SHIELD® AQUA IR 2K requires minimal maintenance.

Where cleaning is necessary, the following methods are recommended:

- Neutral pH cleaning agents

- Soft brushes or non-abrasive cleaning tools
- Low-pressure water cleaning

The use of aggressive solvents, highly alkaline cleaners or abrasive cleaning methods is not recommended, as these may impair the appearance and long-term performance of the coating.

Routine inspection of coated surfaces is recommended, particularly in areas subject to intensive mechanical or chemical exposure.

24. STORAGE

Store both components in their original, unopened containers.

Recommended storage conditions:

- Dry, well-ventilated area
- Protection from direct sunlight
- Frost-free environment
- Away from heat sources and ignition points

Shelf life shall be determined according to the manufacturing date and batch identification indicated on the original packaging.

Containers shall be tightly closed after partial use to prevent contamination and moisture ingress.

25. HEALTH AND SAFETY

The product shall be handled in accordance with all applicable occupational health and safety regulations.

The Safety Data Sheet (SDS) shall be consulted before handling or application.

Recommended Personal Protective Equipment (PPE)

- Safety glasses or chemical splash goggles
- Chemical-resistant nitrile gloves
- Suitable protective clothing
- Respiratory protection when spray application is carried out in insufficiently ventilated areas

As Component B contains polyisocyanates, particular attention shall be paid to:

- Adequate ventilation
- Avoidance of inhalation of vapours and aerosols
- Prevention of skin and eye contact
- Compliance with all applicable occupational exposure limits

During spray application, suitable respiratory protective equipment shall always be used in accordance with local regulations.

26. ENVIRONMENTAL INFORMATION

Unused coating material, contaminated packaging and cleaning agents shall be disposed of in accordance with applicable local environmental and waste management regulations.

Liquid product residues shall **not** be discharged into surface water, groundwater, drainage systems or soil.

Where possible, empty containers should be recycled after appropriate cleaning and in compliance with local regulations.

Users are responsible for complying with all national and local environmental legislation governing the handling, storage and disposal of chemical products.

27. QUALITY ASSURANCE

THERMO SHIELD® AQUA IR 2K is manufactured under a documented quality management system designed to ensure consistent product quality and performance.

Quality control includes, where applicable, laboratory verification of:

- Infrared Reflectance (Surface Optics SOC 410)
- Total Solar Reflectance (TSR)
- Infrared Solar Reflectance (IR-SR)
- Accelerated UV Weathering (MSZ EN ISO 11507)
- Abrasion Resistance (MSZ EN ISO 7784-2)
- Pull-Off Adhesion (MSZ EN ISO 4624)
- Cross-Cut Adhesion (EN ISO 2409)

Routine production control is supported by documented laboratory testing and quality assurance procedures to verify compliance with the specified product characteristics.

28. RECOMMENDED COATING SYSTEMS

The recommended coating system depends on the substrate type, environmental exposure and expected service conditions.

28.1 Steel Substrates

Coating Layer	Product	Recommended DFT
Primer	CATEPOX® KM	80–120 µm

Coating Layer	Product	Recommended DFT
Topcoat	THERMO SHIELD® AQUA IR 2K	60–80 µm
Total Dry Film Thickness		140–200 µm

The CATEPOX® KM epoxy primer provides effective corrosion protection together with excellent adhesion for the THERMO SHIELD® AQUA IR 2K topcoat.

28.2 Concrete Substrates

Coating Layer Product

Primer Suitable concrete primer (where required)

Topcoat THERMO SHIELD® AQUA IR 2K

Concrete substrates shall be fully cured, dry and structurally sound before application.

Residual moisture shall be verified prior to coating.

28.3 Asphalt Substrates

Coating Layer Product

Surface Preparation Cleaning and dust removal

Topcoat THERMO SHIELD® AQUA IR 2K

For new applications on asphalt, a trial area is recommended to verify compatibility, adhesion and appearance before full-scale application.

29. RECOMMENDED DRY FILM THICKNESS (DFT)

Application Recommended DFT

Decorative Coatings 50–60 µm

Industrial Applications 60–80 µm

Heavy-Duty Service 80–120 µm

The final dry film thickness shall always be selected according to the expected service conditions, mechanical loading and project specification.

Multiple coats may be applied where increased durability or enhanced performance is required.

30. EXPECTED PERFORMANCE CHARACTERISTICS

Property	Performance
UV Resistance	Excellent
Weather Resistance	Excellent
Adhesion	Excellent
Abrasion Resistance	Excellent
Infrared Reflectance	High
Total Solar Reflectance (TSR)	High
Chemical Resistance	Good
Slip Resistance	Can be tailored depending on the selected system
Cleanability	Good
Suitability for Exterior Use	Yes

The above performance characteristics are based on available laboratory test results and practical development experience.

Actual performance may vary depending on substrate condition, application method, coating thickness and service environment.

31. BENEFITS FOR DESIGNERS AND SPECIFIERS

THERMO SHIELD® AQUA IR 2K offers several advantages for designers, engineers and project specifiers seeking durable, high-performance protective coating systems for demanding environments.

Key benefits include:

- Reduced solar heat gain through infrared-reflective pigment technology
- Lower surface temperatures under solar exposure
- Excellent long-term UV resistance
- High mechanical durability
- Outstanding abrasion resistance
- Excellent adhesion when used with suitable primer systems
- Water-based technology with reduced VOC emissions
- Two-component chemically cross-linking binder system
- Availability in standard RAL colours and customised colour shades
- Suitable for industrial, transport infrastructure and energy-related applications

The coating system is particularly suitable where long service life, durability and thermal performance are key design considerations.

32. LIMITATIONS

THERMO SHIELD® AQUA IR 2K should **not** be applied under the following conditions:

- On wet or water-saturated substrates
- On frozen surfaces
- When the substrate temperature is below **+10 °C**
- During rainfall or when precipitation is expected before the coating has adequately cured
- On inadequately prepared substrates
- On surfaces contaminated with oil, grease or other substances that may impair adhesion

For substrates or service conditions not covered by this Technical Data Sheet, consultation with SBC Technical Services is recommended prior to application.

33. TECHNICAL SUPPORT

SBC provides technical assistance regarding:

- Selection of appropriate coating systems
- Surface preparation requirements
- Application procedures
- System build-up and coating specification
- Product compatibility
- Project-specific recommendations

For large-scale projects or applications involving severe service conditions, consultation with SBC Technical Services is recommended to ensure optimum system selection and long-term performance.

Additional technical documentation, including Safety Data Sheets (SDS), application guidelines and project-specific recommendations, is available upon request.

34. LEGAL NOTICE

The information contained in this Technical Data Sheet is based on laboratory testing, development experience and technical knowledge available at the time of publication.

The data provided are intended for guidance only and shall not be interpreted as a contractual specification, warranty or guarantee of product performance.

The actual performance of the product depends on numerous factors beyond the manufacturer's control, including but not limited to substrate condition, surface preparation, application method, film thickness, curing conditions and service environment.

It is the responsibility of the user to determine the suitability of the product for the intended application and to ensure that application is carried out in accordance with current technical recommendations and applicable regulations.

SBC reserves the right to modify product specifications or this Technical Data Sheet without prior notice as part of its ongoing product development programme.