

CALCULATION

HEAT TRANSFER COEFFICIENT U

ISOTEX INSULATION SYSTEM



CURRENT STATE

YTONG BRICK P2-500, WIDTH 0.260 M

The current state of the building envelope without the use of the ISOTEX insulation system

Construction composition	Volume kg/m ³	Layer d [m]	Thermal conductivity λ W/m.K	CC factor f _{cc}	Thermal resistance R _{cc}
Internal plaster	1800	0.015	0.87	0	0.049
Ytong brick P2-500, 0.260m		0.260	0.137	0	1.898
Polystyrene, 0.080m		0.080	0.04	0	2.000
Heat transfer resistance on the inside R _{si}					0.130
Transient heat resistance on the outside R _{se}					0.040

$$R_{cc} = d / (\lambda (1 - f_{cc}))$$

$$U = 1 / (R_{si} + \sum (R_{cc}) + R_{se})$$

$$U = 1 / (R_{si} + \sum [d / (\lambda_R (1 - f_{cc}))] + R_{se})$$

$$U = 1 / 4.117$$

Heat transfer coefficient U

$$U = 0.243 \text{ W/m}^2.\text{K}$$

The required value of the heat transfer coefficient of building structures can be found in the state standard STN 73 0540-2: 2012 Thermal protection – Thermal technical properties of building structures and buildings (revision of STN 73 0540), prof. Ing. Zuzana Šternová, PhD. and its valid value since 2016 is: U = 0.22 W/m².K (in CZ: U = 0.30 W/m².K

ISOTEX INSULATION SYSTEM YTONG BRICK P2-500, WIDTH 0.260 M

Construction composition	Volume kg/m ³	Layer d [m]	Thermal conductivity λ W/m.K	CC factor f _{cc}	Thermal resistance R _{cc}
Internal plaster	1800	0.015	0.87	0.65	0.049
Internal plaster IsoTex R70, 0.010m		0.010	0.07	0.65	0.408
Polystyrene, 0.080m		0.080	0.04	0.25	2.667
Ytong brick P2-500, 0.260m		0.260	0.137	0.35	2.920
Heat transfer resistance on the inside R _{si}					0.130
Transient heat resistance on the outside R _{se}					0.040

$$R_{cc} = d / (\lambda (1 - f_{cc}))$$

$$U = 1 / (R_{si} + \sum (R_{cc}) + R_{se})$$

$$U = 1 / (R_{si} + \sum [d / (\lambda_R (1 - f_{cc}))] + R_{se})$$

$$U = 1 / 6.235$$

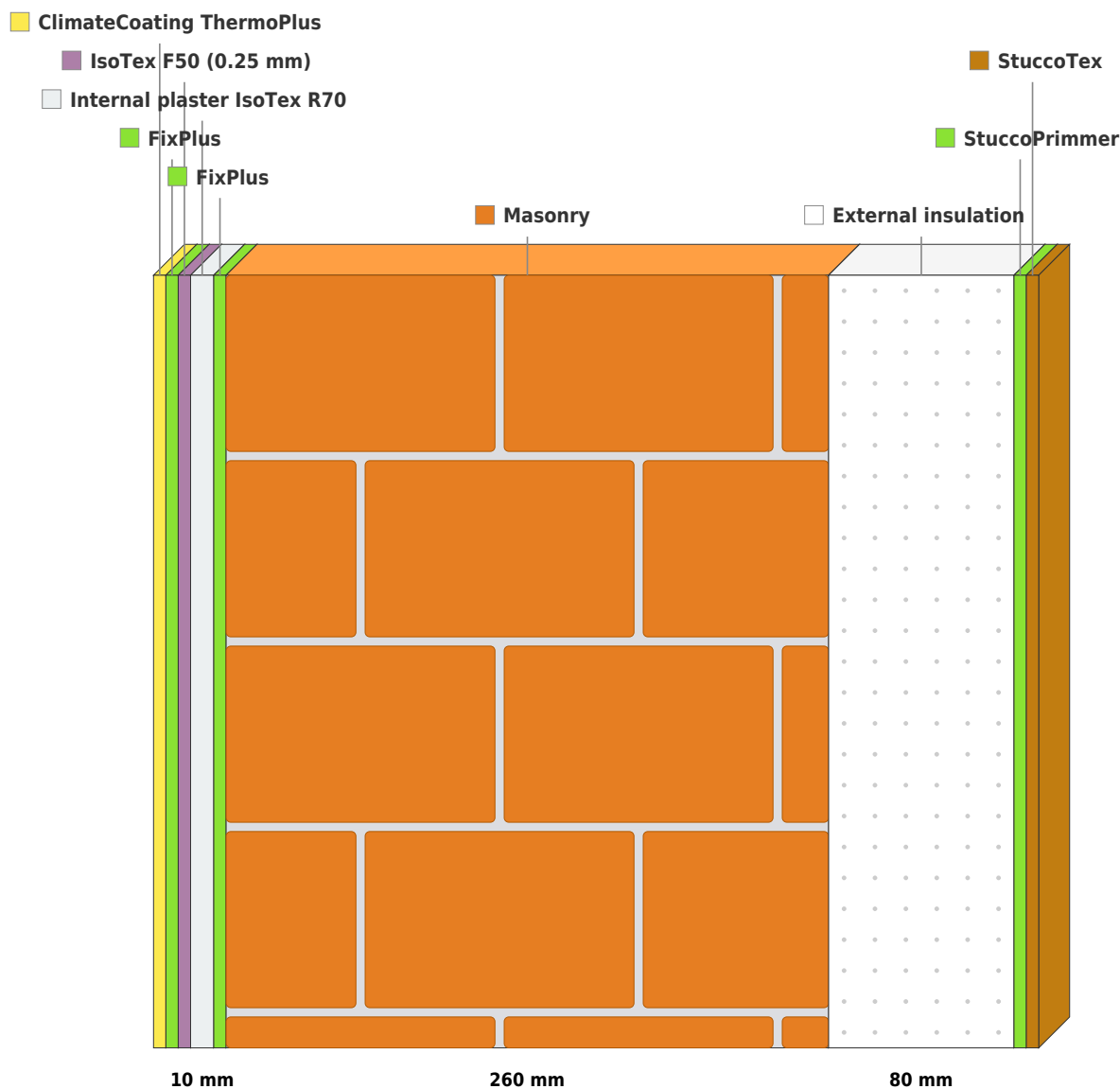
Heat transfer coefficient U

$$U = 0.160 \text{ W/m}^2.\text{K}$$

The required value of the heat transfer coefficient of building structures can be found in the state standard STN 73 0540-2: 2012 Thermal protection – Thermal technical properties of building structures and buildings (revision of STN 73 0540), prof. Ing. Zuzana Šternová, PhD. and its valid value since 2016 is: U = 0.22 W/m².K (in CZ: U = 0.30 W/m².K)

MASONRY CROSS-SECTION (STRUCTURE COMPOSITION)

ISOTEX insulation system / ClimateCoating



Interior paint
Surface finish
Penetration coat

Exterior paint
Thermal insulation plaster
Plaster StuccoTex

HEAT TRANSFER COEFFICIENT U

Comparison of the heat transfer coefficient U before and after the application of the ISOTEX insulation system.

U value reduced by

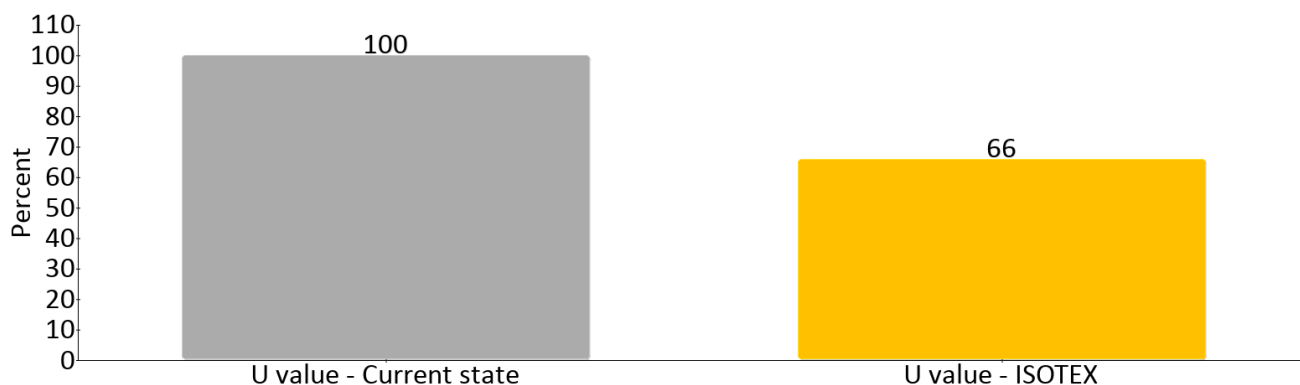
-34%

By applying the ISOTEX system, we can significantly reduce the heat transfer coefficient of masonry.

Current state: $U = 0.243 \text{ W/m}^2\cdot\text{K}$

ISOTEX system: $U = 0.16 \text{ W/m}^2\cdot\text{K}$

Heat transfer coefficient U (percent)



THERMAL RESISTANCE OF MASONRY R

Comparison of the thermal resistance of masonry R before and after the application of the ISOTEX insulation system.

R value increased by

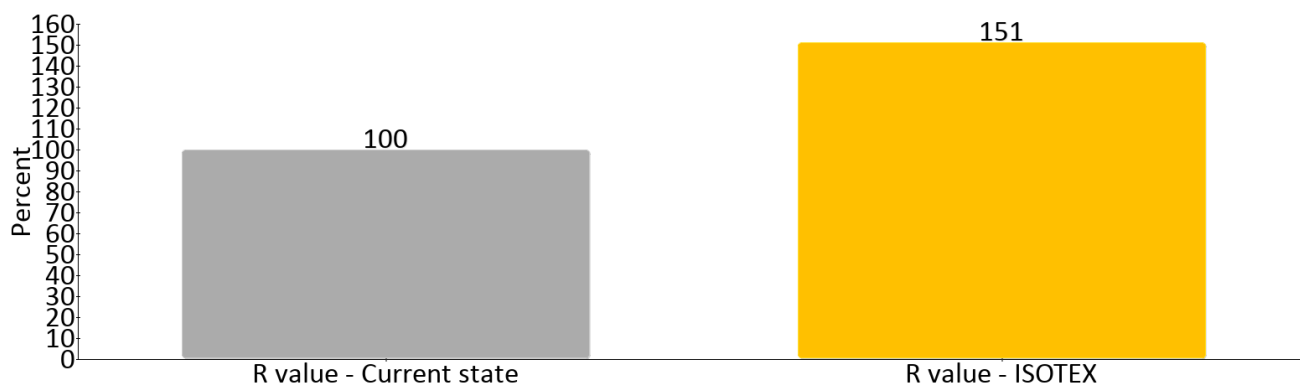
51.4%

By applying the ISOTEX system, we can significantly improve the thermal resistance R of masonry.

Current state: $R = 4.117 \text{ m}^2\cdot\text{K/W}$

ISOTEX system: $R = 6.235 \text{ m}^2\cdot\text{K/W}$

Thermal resistance of masonry R (percentage)



ENERGY SAVING

This calculation is used for estimated energy savings. It is based on a simplified procedure (DIN 4108-6). [Dipl.-Ing. Matthias G. Bumann]

HEAT TRANSFER COEFFICIENT U

Current state: $U = 0.243 \text{ W/m}^2.\text{K}$

ISOTEX system: $U = 0.16 \text{ W/m}^2.\text{K}$

$$\Delta U = 0.083 \text{ W/m}^2.\text{K}$$

ANNUAL HEAT DEMAND

$$Q_h = 66 \times (H_T + H_v) - 0.95 \times (Q_s + Q_i)$$

Q_s = solar heat gains (windows)

Q_i = internal heat gains

H_T = heat loss by transmission

H_v = heat loss through ventilation

HEAT LOSS BY TRANSMISSION

$$H_T = \sum (F_x U_i A_i) + 0.05 A$$

F_x = temperature correction factor

$F_x = 1$ (exterior wall)

U = U value of exterior wall

A = area (surface) of exterior wall

Difference Δ

$$\Delta H_T = \sum (F_x \Delta U_i A_i) + 0.05 A$$

$$\Delta H_T = \sum (1 * 0.083 * 100) + (100 * 0.05)$$

$$\Delta H_T = 13.251 \text{ kWh/a}$$

ENERGY SAVING

$$\Delta Q_h = 66 \times \Delta H_T$$

$$\Delta Q_h = 66 \times \Delta H_T$$

$$\Delta Q_h = 66 \times 13.251 \text{ kWh/a}$$

Annual preliminary savings on heating:

$$\Delta Q_h = 874.6 \text{ kWh/a}$$

Annual preliminary savings on heating:
(electricity)

At the price for electricity 0.15 EUR/kWh

131.2 EUR

Annual preliminary savings on heating:
(natural gas)

At the price of natural gas 0.051 EUR/kWh

39.3 EUR

PRELIMINARY PRICE CALCULATION FOR THE MATERIAL REQUIRED FOR THE ISOTEX INSULATION SYSTEM

No.	Product	Count m ²	Cena za m ²	Number of packs.	Total price without VAT
1	External surface finish StuccoTex 80 (15.00kg)	100	22.50 EUR	10	2 250.00 EUR
2	ClimateCoating StuccoPrimmer (12.50l)	100	3.50 EUR	2	350.00 EUR
3	Pigmentation (Outside) StuccoTex 80	100	0.50 EUR		50.00 EUR
4	Internal plaster IsoTex R70 , in thickness 0.010m (10.00kg)	100	11.13 EUR	42	1 113.00 EUR
5	Internal surface finish IsoTex F50 (0.25 mm) (10.00kg)	100	1.86 EUR	7	185.50 EUR
6	ClimateCoating ThermoPlus (12.50l)	100	4.20 EUR	2.4	420.00 EUR
7	Penetration coat ClimateCoating FixPlus	200	0.28 EUR	0.8	56.00 EUR
Total price without VAT					4 424.50 EUR

Final price of ISOTEX insulation material

4 424.50 EUR
without VAT

The total resulting amount is the preliminary price for the material of the ISOTEX insulation system. The price may vary slightly depending on the pigmentation (choice of colour shade).

The number of packs is NOT rounded to whole packs, therefore the final price is calculated EXACTLY per m².

The price does not include the work - application of the ISOTEX system.

ClimateCoating ThermoProtect and ThermoPlus coatings are supplied in basic white color. In the case of a different shade of paint, the pigmentation of the coating is required, which depends on the chosen shade. The price is approx. 0.50 Eur / m²

ISOTEX INSULATION SYSTEM

The ISOTEX insulation system is suitable for all modern ecological buildings as well as renovated buildings. In winter, it reduces heat loss by up to three times, and in summer it significantly saves on air conditioning.

Thanks to its unique properties, the ISOTEX system provides moisture regulation in masonry and keeps it dry. It can literally "suck" excess moisture from the substrate and keeps the wall at a constant level of moisture - dry all year round. The water absorption coefficient is less than 3% for 120 days of presence in water and thanks to its diffusion properties (water vapor permeability coefficient = 7) it helps to quickly remove moisture and significantly limits the formation of mold on the surface and inside the building structure.



Long functional life and protection of the building structure

The ClimateCoating IsoTex insulation system has a very long service life (minimum 30 years) thanks to the materials used. Contact insulation was replaced by thermal insulation plaster, which is applied directly to the masonry without unnecessary anchoring and joints. As a result, the external facade perfectly resists mechanical damage. It works and protects the house throughout its lifetime.



Regulates and reduces humidity, is vapor permeable

Thanks to the unique properties of the thermal insulation plaster, its special components and nanotechnology in the thermoceramic coating, ClimateCoating regulates the humidity in the masonry, i.e. keeps the masonry always dry. And only a "dry coat keeps you warm"! It reduces moisture in the structure, its passage, storage and removal of condensation towards the exterior, protects against rain and enables moisture evaporation even on winter days. Both components of the system are vapor permeable.



It limits the risk of mold and algae formation on the facade

By removing moisture and permanent elasticity, it minimizes the risk of mold and algae on the surface and inside the building structure.

CERTIFICATES

CERTIFIKÁT

Certifikační orgán
Pobočka 0200 – České Budějovice
vydává

CERTIFIKÁT
č. 020-045518

pro produkt
ClimateCoating IsoTex
typ / varianta: tepelně izolační omítkový systém

žadatel:
HFR s.r.o.
IČO: 0377255
Adresa: Podbrazdova 276/28, 612 00 Královo Pole, Brno, CR
Výrobce: HFR s.r.o.
IČO: 0377255
Adresa: Podbrazdova 276/28, 612 00 Královo Pole, Brno, CR
Výrobce: SICC Coatings GmbH
Adresa: Parkstrasse 78-82, 13156 Berlin / Německo
Zakázka: Z020210158

Certifikační schéma 1a podle ČSN EN ISO/IEC 17067 zahrnující zkoušení vzorků produktu.

Certifikační orgán tímto certifikátem ověřuje, že:
• u vzorku zhotoveného produktu zjevně absence jeho vlastností s požadavky Technické specifikace č. 020-045518, vydané TZÚS Praha, s.p. – pobočka České Budějovice, dne 01. 12. 2021.
Tento certifikát je vydan na základě Protokolu o výsledku certifikace produktu č. 020-045517 ze dne 02. 12. 2021 vydaného TZÚS Praha, s.p. – pobočkou České Budějovice, který je předmět certifikace. Protokol obsahuje závěry zjištění a podmínky platnosti certifikátu.

Certifikát má 1 přílohu (1 strana), která je nedílnou součástí certifikátu.

České Budějovice, 03. prosince 2021 Platnost certifikátu do: 31. prosince 2024

Řešitel certifikátního orgánu
Ing. Milan Pálka
žalovaný vedoucí certifikátního orgánu



TECHNICKÝ A ZKUSÉBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Test Institute for Construction Prague
Centrální laborator – zkušebna Předměstí nad Labem
Křovčova 88, 102 00 Praha 10, Pankráz
tel.: +420 266 901 500, e-mail: test@tuzs.cz, www.tuzs.cz

PROTOKOL

zkušební laborator
č. 050 - 023220

o počáteční zkouše typu tepelně izolační omítky
IsoTex R70, EN 998-1

Objednatel: HFR s.r.o.
Adresa: Veľká ohrádká 1075/28, Žilina, SK
IČO: 52088308
Výrobce: Z050120050
Zakázka č.: Z050120050

Počet stran protokolu včetně strany titulní: 3 Počet stran příloh: 2

Vypracoval: Josef Jech
Schválil: Ing. Zdeněk Fiata
Výsledek: 1
Počet výsledků: 1

Protokol n. L., 21. 08. 2020



TECHNICKÝ A ZKUSÉBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Test Institute for Construction Prague
Centrální laborator – zkušebna České Budějovice
Central Laboratory – Testing Department České Budějovice
Nemancova 441, 370 10 České Budějovice
tel.: +420 387 003 211, e-mail: test@tuzs.cz, www.tuzs.cz

PROTOKOL TEST REPORT

č. / No. 020-045398
o stanovení nasákavosti
on determination of water absorption

Objednatel: HFR s.r.o.
Adresa: Podbrazdova 276/28
612 00 Královo Pole, Brno
Česká Republika
IČO: 377255
Company ID: HFR s.r.o.
Výrobce: Podbrazdova 276/28
612 00 Královo Pole, Brno
Česká Republika
Zkušební vzorek: ClimateCoating IsoTex
Test sample: Z020210158
Zakázka č.: Z020210158
Půl stran protokolu včetně strany titulní: 4 Počet stran příloh: 0
Number of pages of the Test Report incl. the page: 4 Pages of annexes: 0

Vypracoval: Michal Čondl
Schválil: Ing. Dana Pilařová
Výsledek: 1
Počet výsledků: 1

Protokol n. L., 25. 10. 2021



PRODUCT CERTIFICATION BODY
The Lukasiewicz Research Network - Institute
for Engineering of Polymer Materials and Dyes
Center for Paints and Plastics
Certification of Products
and Standardization
44-100 Gliwice, ul. Chorzowska 50A



CERTIFICATE OF CONFORMITY No. 24/PN/2023

Issued according to product certification scheme type 5 according to PN-EN ISO/IEC 17067:2014-01 "Product certification program for the certificate of conformity (CZ)", issue 13 of 1 June 2021

Name and address of the owner of certificate: **SICC Coatings GmbH**
Wackenbergstrasse 78-82
D-13156 Berlin

Name of product: "Exterieur" - Coating - Application
"History" - Coating - Application
"ThermoProtect" - Coating - Application

ICS code: 87.040

The product meets the requirements: **PN-C-81913:1998 Dispersion paints for painting of building facades**

The test report: **No. GF/150/2023, GF/150a/2023**
Accredited Laboratory No. AB 183

The certificate is valid from 14.09.2023 to 13.09.2026

The certificate remains in force provided that the body observes the requirements specified in the agreement No. 32/09/2023/GC and concerns only the products having identical characteristics as the test sample(s) and complying with the requirements defined above.

Manager of Certification
of Products and Standardization
Marcin Pasich

Director
of Center for Paints and Plastics
Mariola Bodzek-Kochel

Gliwice, 14.09.2023

Wz-566/21/21



P.O. Box 2400
Cookeville, Tennessee 38502-2400
Phone: 931-372-8871
Fax: 931-525-3896

Calculated Solar Reflectance Indices (SRI) Report

Test Number: RD141318 Date of Test: February 20, 2014
Specimen Number: 1827140214-1.9 Date of Manufacture: Unknown
Description of Test Specimen: ThermoActive TopShield TopCoat

Test Method: ASTM E 1980-11 "Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces"

Report Prepared For: SICC GmbH / Mr. Dagmar Gräßl

Description: Measured solar reflectance and measured thermal emittance were used to calculate Solar Reflectance Index (SRI) in accordance with ASTM E 1980-11 for nine coated panel specimens provided by SICC GmbH. The specimens were labeled as identified in the table below. The coated panel specimens were tested for thermal emittance and solar reflectance. The average thermal emittance and solar reflectance for all nine panels were used for the SRI calculation. The calculated SRI for low, medium and high wind speed is listed below.

Specimen Number	Identification	Reflectance	Emittance	Solar Reflectance Index (SRI)		
				Low Wind	Med Wind	High Wind
1827140214-1.9	ThermoActive TopShield TopCoat	0.887	0.875	111.2	111.4	111.5

David W. Yarbrough, PhD, PE

3-6-2014
Date

Page 2 of 4
Report No. RD14104

CLIMATECOATING COATINGS



ClimateCoating coatings are intelligent functional coatings for buildings, interiors and industrial applications. Thanks to the unique reflective membrane technology, building materials are permanently protected.

ClimateCoating products offer practical solutions to problems: they minimize the risk of algae and mold formation on exterior and interior walls, prevent moisture from entering the building structure, significantly reduce overheating of roofs, interiors, containers or tanks.

The reflective membrane technology consists of specially developed glass-ceramic vacuum hollow bodies. We combined these glass-ceramic hollow bodies with an extremely adhesive, specially developed dispersion and selected activators. After applying the paint, it creates a so-called reflective membrane. The effect and benefits of the coating are based on the following physical construction processes: reflection, directional evaporation and antistatic. The extraordinary resistance of the material makes the coatings robust, adaptable and very durable.

More at: <https://www.climatecoating.com/>

REFERENCES



Contact:

HFR, s.r.o.

Dolné Rudiny 1, 010 01 Žilina

<https://www.climatecoating.sk>, info@hfr.sk

tel.: +421 903 805 121

ClimateCoating® - Intelligent value-added coatings. For buildings, interiors and industrial applications.

Eco-friendly. Powerful. Efficient.
Made in Germany. Made for you.

SICC Coatings GmbH

Wackenbergstraße 78-82, 13156 Berlin, Germany

Tel.: +49 (0) 30 500196-0, E-Mail: info@sicc.de

www.sicc-coatings.com



SICC Coatings GmbH, based in Berlin, is a leading specialist supplier of climatically active coatings with the longest experience in all climates and all fields of application. The functional coatings are based on reflective membrane technology. For the energy-saving effect of this technology, SICC Coatings was awarded the "German Innovation Award" in 2018 and the "Energy Efficiency Award" in Singapore. SICC Coatings is DIN EN ISO 9001:2015 and 14001:2015 certified in the field of quality and environmental management.