

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
Heat transfer resistance on the inside R _{si}					0.130
Transient heat resistance on the outside R _{se}					0.040

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

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

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

$$U = 1 / 2.117$$

Heat transfer coefficient U

$$U = 0.472 \text{ W/m}^2.\text{K}$$

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
Ytong brick P2-500, 0.260m		0.260	0.137	0.35	2.920
External plaster IsoTex R70, 0.030m	360	0.030	0.07	0.65	1.224
Heat transfer resistance on the inside R_{si}					0.130
Transient heat resistance on the outside R_{se}					0.040

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

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

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

$$U = 1 / 4.363$$

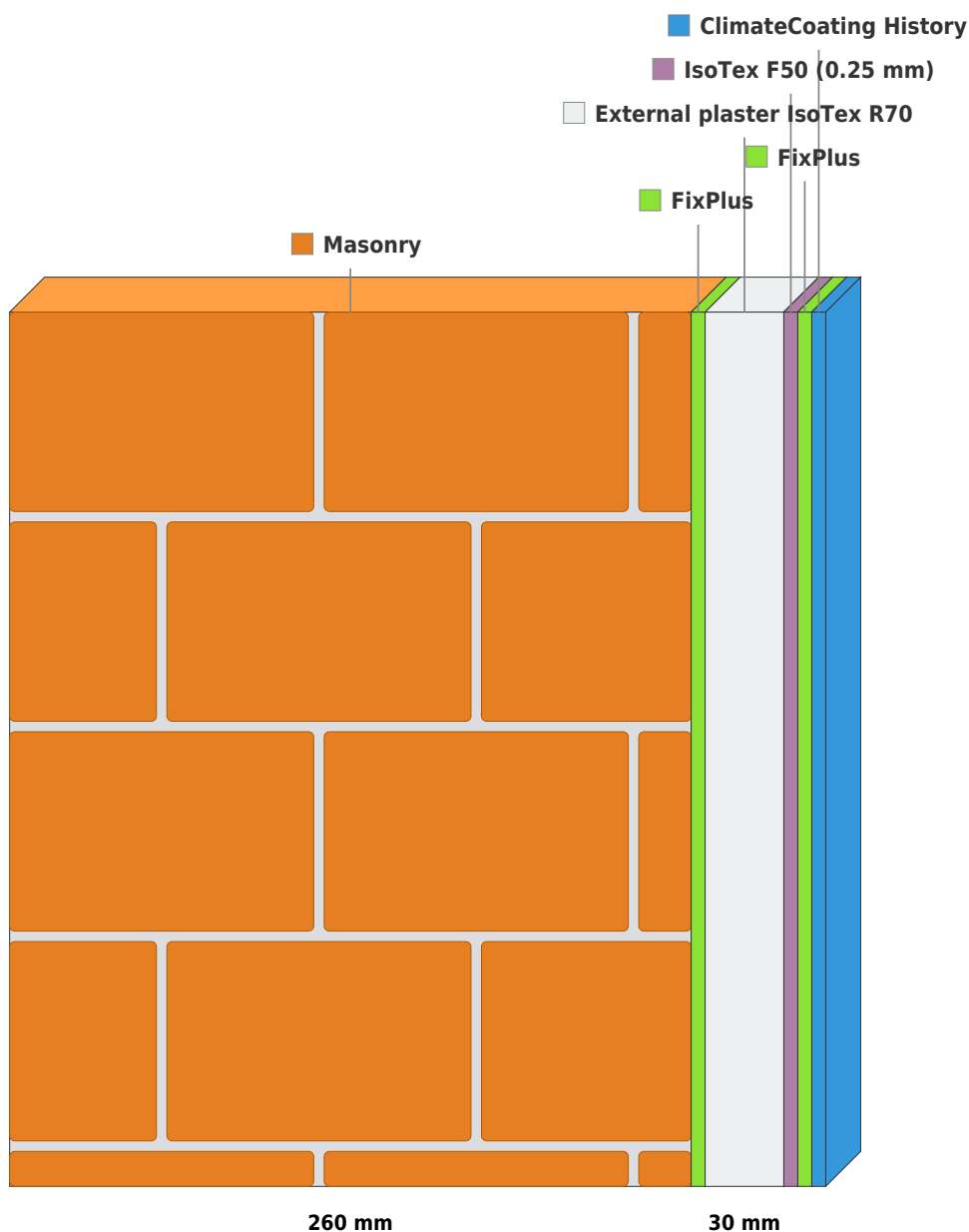
Heat transfer coefficient U

$$U = 0.229 \text{ W/m}^2.\text{K}$$

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: $U = 0.22 \text{ W/m}^2.\text{K}$ (in CZ: $U = 0.30 \text{ W/m}^2.\text{K}$)

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

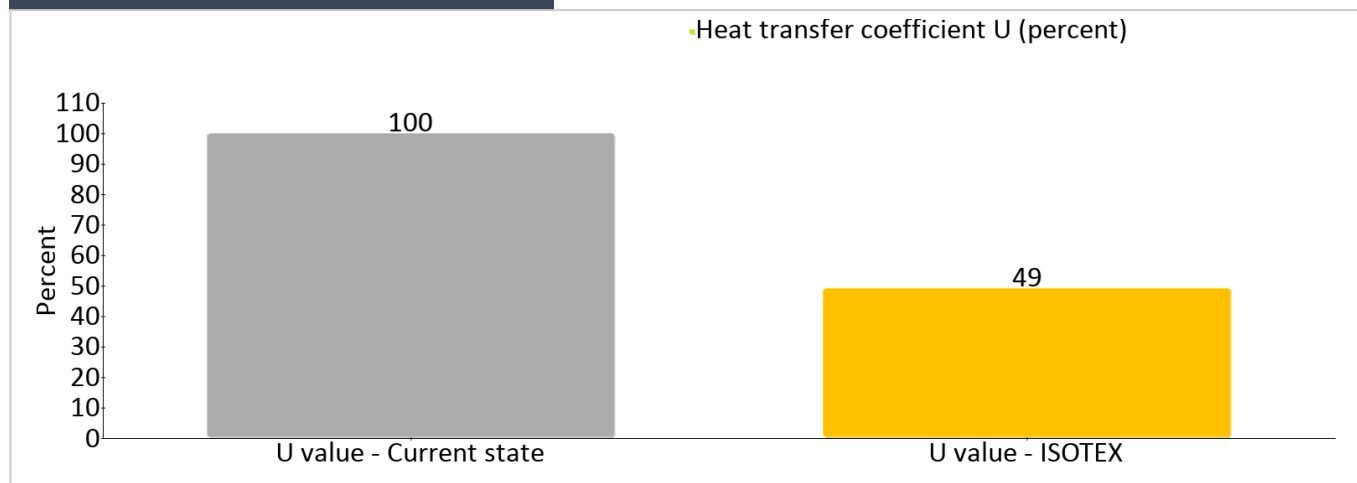
Comparison of the heat transfer coefficient U before and after the application of the ISOTEX insulation system.

U value reduced by
-51.5%

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

Current state: $U = 0.472 \text{ W/m}^2\cdot\text{K}$

ISOTEX system: $U = 0.229 \text{ W/m}^2\cdot\text{K}$



THERMAL RESISTANCE OF MASONRY R

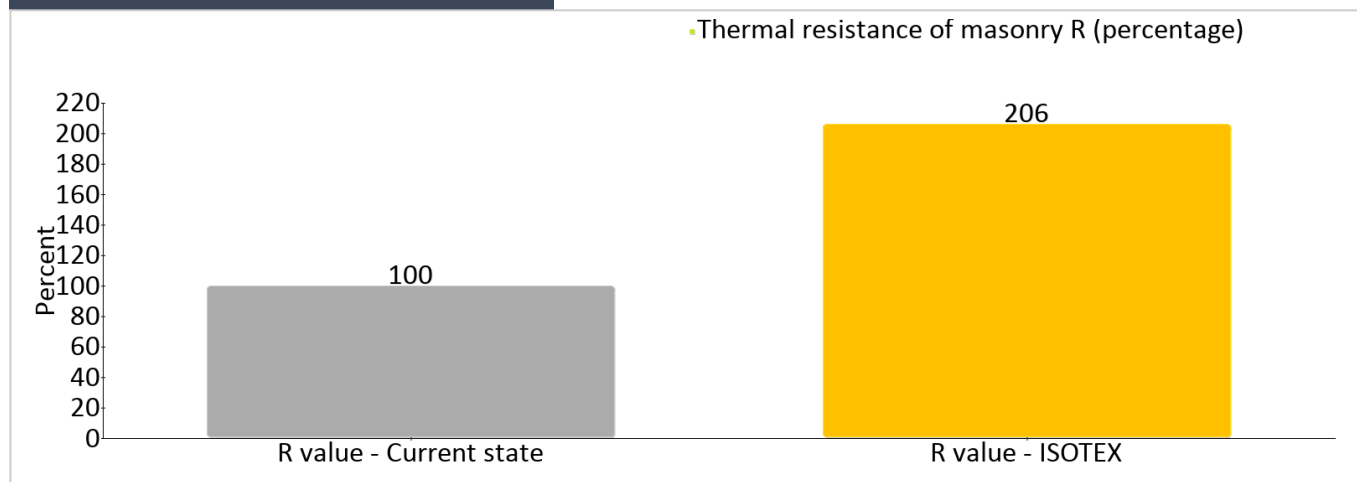
Comparison of the thermal resistance of masonry R before and after the application of the ISOTEX insulation system.

R value increased by
106.1%

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

Current state: $R = 2.117 \text{ m}^2\cdot\text{K/W}$

ISOTEX system: $R = 4.363 \text{ m}^2\cdot\text{K/W}$



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: $U = 0.472 \text{ W/m}^2.\text{K}$

ISOTEX system: $U = 0.229 \text{ W/m}^2.\text{K}$

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

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

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

$$\Delta H_T = \sum (1 \times 0.243 \times 100) + (100 \times 0.05)$$

$$\Delta H_T = 29.322 \text{ kWh/a}$$

ENERGY SAVING

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

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

$$\Delta Q_h = 66 \times 29.322 \text{ kWh/a}$$

Annual preliminary savings on heating:

$$\Delta Q_h = 1935.2 \text{ kWh/a}$$

Annual preliminary savings on heating:
(electricity)

At the price for electricity 0.15 EUR/kWh

290.3 EUR

Annual preliminary savings on heating:
(natural gas)

At the price of natural gas 0.051 EUR/kWh

86.9 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	ClimateCoating History (12.50l)	100	8.00 EUR	3.2	800.00 EUR
2	External plaster IsoTex R70, in thickness 0.030m (10.00kg)	100	33.39 EUR	126	3 339.00 EUR
3	External surface finish IsoTex F50 (0.25 mm) (10.00kg)	100	1.86 EUR	7	185.50 EUR
4	Pigmentation (Outside) History	100	0.50 EUR		50.00 EUR
5	Penetration coat ClimateCoating FixPlus	200	0.28 EUR	0.8	56.00 EUR
Total price without VAT					4 430.50 EUR

Final price of ISOTEX insulation material

4 430.50 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

Č. 020-045518

ClimateCoating IsoTex
typ / variant: 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: SICCCoatings 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 a požadavky Technické specifikace č. 020-045518, vydané TZÚS Praha, s.p., - pobočka Česká 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., - pobočka Česká Budějovice, který je předmět certifikace. Protokol obsahuje závěry zjištění a podmínky platnosti certifikátu.

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

Česká 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 100, 130 00 Praha 3, ČR
tel.: +420 266 901 500, e-mail: test@tuzs.cz, www.tuzs.cz

PROTOKOL

zkušební laboratoře

č. 050 - 023220

o počáteční zkoušce typu tepelně izolační omítky
ISOtex R70, EN 998-1

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

Počet stran protokolu včetně strany titulní: 3

Počet stran příloh: 2

Vypracoval:

Josef Jech

Schválil:



Výsledek č.:

Počet výsklů:

Předmět č. n. L., 21. 08. 2020

Protokol: 1) Výsledky zkoušek v tomto protokolu, uvedené na stránkách jsou bezchybné, platnost a kontrolní kód dokumentu 2) Tato zpráva obsahuje všechny údaje potřebné k tomu, aby bylo možné reprodukovat zkoušky, aniž by došlo k chybám.

Technická a zkušební ústava stavební Praha, s.p., Centrální laborator
Hornomátská 100, 130 00 Praha 3, ČR
Telefon: +420 266 901 500
E-mail: test@tuzs.cz
Internet: www.tuzs.cz
Zkušební a zkušební ústava stavební Praha, s.p., Centrální laborator, Předměstí nad Labem, IČO: 52088308, DIČ: CZ52088308



TECHNICKÝ A ZKUSÉBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Test Institute for Construction Prague
Centrální laborator - zkušebna Česká Budějovice
Centrální laborator - Testing Department Česká Budějovice
Hornomátská 141, 370 10 Česká Budějovice
tel.: +420 387 003 211, e-mail: test@tuzs.cz, www.tuzs.cz

Zkušební laborator č. 1018.3 akreditovaná ČIA podle ČSN EN ISO/IEC 17025:2018.
Testing Laboratory No. 1018.3 accredited by ČIA pursuant to ČSN EN ISO/IEC 17025:2018.

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
Adresa:

Zkušební vzorek: ClimateCoating IsoTex
Test sample: Z020210158
Zakázka č.: Z020210158

Počet stran protokolu včetně strany titulní: 4

Počet stran příloh: 0

Vypracoval:

Michal Čondl

Schválil:

Ing. Dana Pilařová

Výsledek č.:

Počet výsklů:

Česká Budějovice, 25. 10. 2021

Protokol: 1) Výsledky zkoušek v tomto protokolu, uvedené na stránkách jsou bezchybné, platnost a kontrolní kód dokumentu 2) Tato zpráva obsahuje všechny údaje potřebné k tomu, aby bylo možné reprodukovat zkoušky, aniž by došlo k chybám.

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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: SICCCoatings 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 1889-11, "Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces"

Report Prepared For: SICCCoatings 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 1889-11 for nine coated panel specimens provided by SICCCoatings 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. RD141318

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.

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Made in Germany. Made for you.

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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.