KEIM Coolit-AP

IR-reflective silicate exterior paint
Passive mineral protection

Approved!

PREMIUM
is our Standard.

Problem:
The urban heat island effect

The UHI effect

Urban conurbation areas with a high density of buildings suffer particularly from global warming; in future, people living in these parts of the world will have to expect a considerable reduction in the quality of life.

Today already, the average temperature in large cities is between five and eleven degrees higher than in the surrounding countryside. Scientists refer to this phenomenon as the urban heat island effect or UHI effect for short. The UHI effect is a typical feature of the climatic situation in urban conurbation areas and has several causes.

One essential factor consists in the way building materials absorb solar energy. Concrete, asphalt and stone have high thermal capacities and high thermal conductivity, so that they heat up considerably during the day; at night this heat is then released persistently into the surrounding air. As a result, the air in urban areas is no longer able to cool down at night.

Thermal image: city and surrounding countryside

The absorption of heat by building surfaces also contributes to this warming effect. The absorption of solar energy by facade surfaces makes itself felt right through to the inside of a building. The thermal energy passes through the cross-section of the outer wall and thus also increases the inside temperature.

In warm regions, this increase in temperature can become unbearable for the population. To keep rooms habitable, technical air-conditioning is necessary which in turn emits exhaust heat into the urban air.

How can we counteract this development? Are there any measures that can help to cool mega cities down to a tolerable level? Or possibilities for avoiding temperature peaks in inside rooms by means of passive effective measures to the building shell?

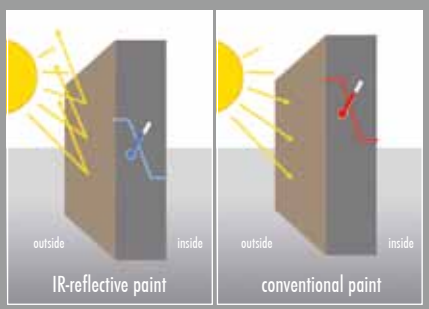
One possible approach: IR-reflective exterior paint

Solution: paint with IR reflection

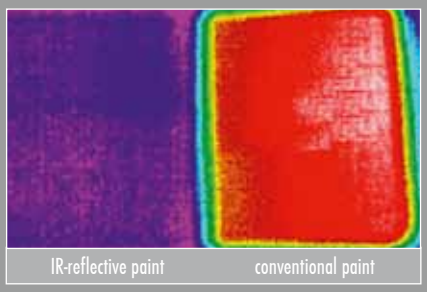
KEIMFARBEN has taken up the global problem of urban warming and developed a building-related passive measure consisting of a special IR-reflective exterior paint with temperature-lowering effect as heat protection.

About 52% of solar radiation energy is in the infra-red range. IR-reflective exterior paint with strong colours reflects this thermal energy, with noticeable reductions in the absorption of heat by the building surface and in the flow of heat into the inside of the building.

IR-reflective exterior paint absorbs less radiation energy than conventional paint. The surface remains cooler so that less heat is conducted into the inside rooms. This saves hard cash in terms of air-conditioning costs.

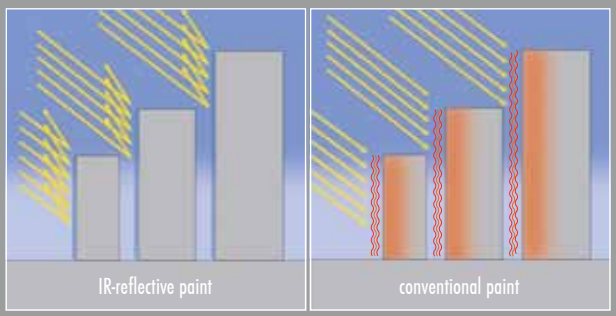


Innovation to contain the UHI effect



The thermal image of two surfaces clearly shows that IR-reflective exterior paint stays much cooler than conventional paint in the same colour.

When used extensively, IR-reflective exterior paint can have a positive influence on thermal absorption of whole neighbourhoods, thus making a contribution to improving the urban climate.



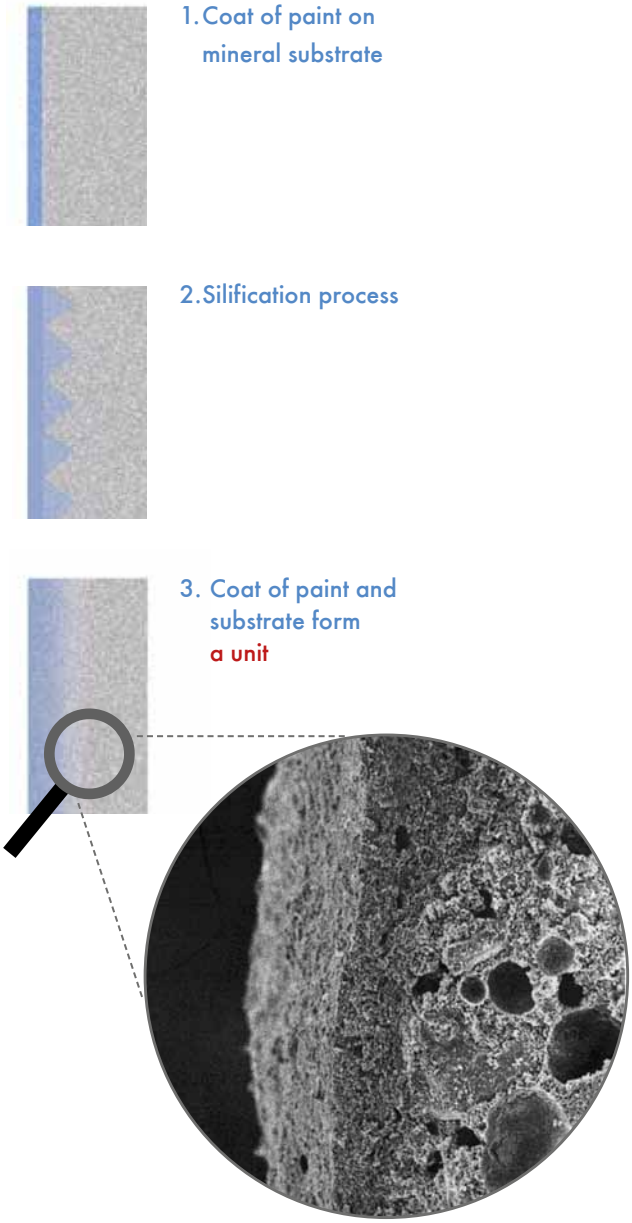
KEIM Coolit-AP: the first mineral exterior paint with IR reflection

The silicate principle

KEIM Coolit-AP is the first mineral paint with IR-reflective effect, developed specially for hot, extreme climate conditions and aggressive sunlight. This unique attribute results from the use of selected natural raw materials. The ideal combination of liquid potassium silicate as binder, mineral fillers from natural deposits and solely inorganic colour pigments guarantees maximum weather resistance and unsurpassed durability.

The principle of silicate technology is based on special bonding of water glass as binder, a chemical bond with the mineral substrate and other reaction partners such as fillers. This results in a firm, hugely stable bond between the paint and the coating substrate (plaster, natural stone, concrete, etc.).

The mineral bonding principle of silification makes a coating of KEIM Coolit-AP extremely durable with a far longer life-cycle than a coating with conventional organic paints, where the coating bonds with the substrate merely as a result of superficial adhesion forming a film on the surface



The silicate bonus to contain the UHI effect

Colour-fast, durable and vapour-permeable

KEIM Coolit-AP contains only light-fast, UV-stable inorganic pigments. This guarantees unrivalled colour-fastness and UV-resistance, even in very intensive sunlight.

Coolit-AP is also free of plasticizers, solvents and preservatives. KEIM Coolit-AP presents an outstanding ecological profile, from raw material extraction via production, application and the entire life-cycle of the coating through to disposal.

One major advantage of KEIM Coolit-AP is its extremely high vapour-permeability. The porous structure of the bonded water glass lets water vapour permeate almost unhindered from the inside through the coating. This ensures that moisture passes harmlessly to the outside while preventing it from accumulating between the coating and the substrate.

Testing KEIM Coolit-AP

Performance test
Test design

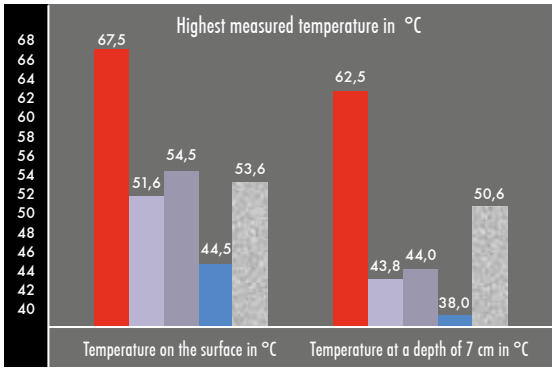
Comprehensive performance tests have demonstrated how effective the IR technology of KEIM Coolit-AP is.

Five samples were produced for the laboratory tests. The test substrate consisted of concrete slabs 7 cm thick which received two coats of the paint samples. RAL 7043 „anthracite" was chosen as the uniform colour.

One concrete slab was left without a paint coating to act as comparison sample. The temperature sensors were arranged in such a way as to register both the temperatures on the surface and the temperatures deep down inside the structure. The test specimens were heated by simulation radiator under constant stationary test conditions. The second sensor was located at a depth of 70 mm inside the test specimens.

The following variants were tested:

- Conventional acrylic paint (without IR)
- IR paint S: acrylate exterior paint with IR-reflective properties
- IR paint N: acrylate exterior paint with IR-reflective properties
- **KEIM Coolit-AP**
- Concrete without coating (zero sample)



Sample designation	Temperature on the surface in °C	Temperature at a depth of 7 cm in °C	Difference in surface temperature compared to concrete in °C	Difference in surface temperature compared to uncoated concrete as %	Difference in surface temperature compared to conventional acrylic paint in °C
Conventional acrylic paint	67.5	62.5	13.9	25.9	Reference
IR paint S	51.6	43.8	–2.0	-3.7	-15.9
IR paint N	54.5	44.0	0.9	1.7	-13.0
KEIM Coolit-AP	**44.5**	**38.0**	**–9.1**	**-17.0**	**-23.0**
Uncoated concrete	53.6	50.6	Reference	Reference	-13.9

KEIM Coolit-AP: the high-tech revolution for the facade

The facts:

- KEIM Coolit-AP significantly reduces the temperature on the surface and inside the building (38.0 °C compared to 50.6 °C)*.
- KEIM Coolit-AP keeps the surface up to 23 °C* cooler than conventional paints
- KEIM Coolit-AP produces better results than every other IR paint in the test*
- KEIM Coolit-AP is a top-quality IR-reflective mineral coating

What this means for you:

+ Less temperature-induced stress in the structure, resulting in a far longer life-cycle
+ Less energy consumption for air-conditioning in the rooms – KEIM Coolit-AP deflects heat and keeps rooms cool. This saves energy costs.
+ Counteracts the UHI effect. This keeps city centres cooler.
+ KEIM Coolit-AP is more than just paint. Effective heat protection, extreme durability and unrivalled colour-fastness – three attributes in one product!

* Tested by GWP Gesellschaft für Werkstoffprüfung mbH

KEIM Coolit-AP

- Keeps the heat away
- Reduces the UHI effect
- Unrivalled colour-fastness
- Durable
- Reduces temperature-induced stress
- Vapour-permeable
- Economical
- Ecological
- Sustainable

... cool paints for facades

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