



REFLECTIVE COATINGS

Aluminum pigments for Radiation Reflection Exterior & Interior

Edris Giunta , Milano Colori– Coatings - Sales & Technical Service

Agenda

▶ Milano Colori / Eckart

▶ Product Range

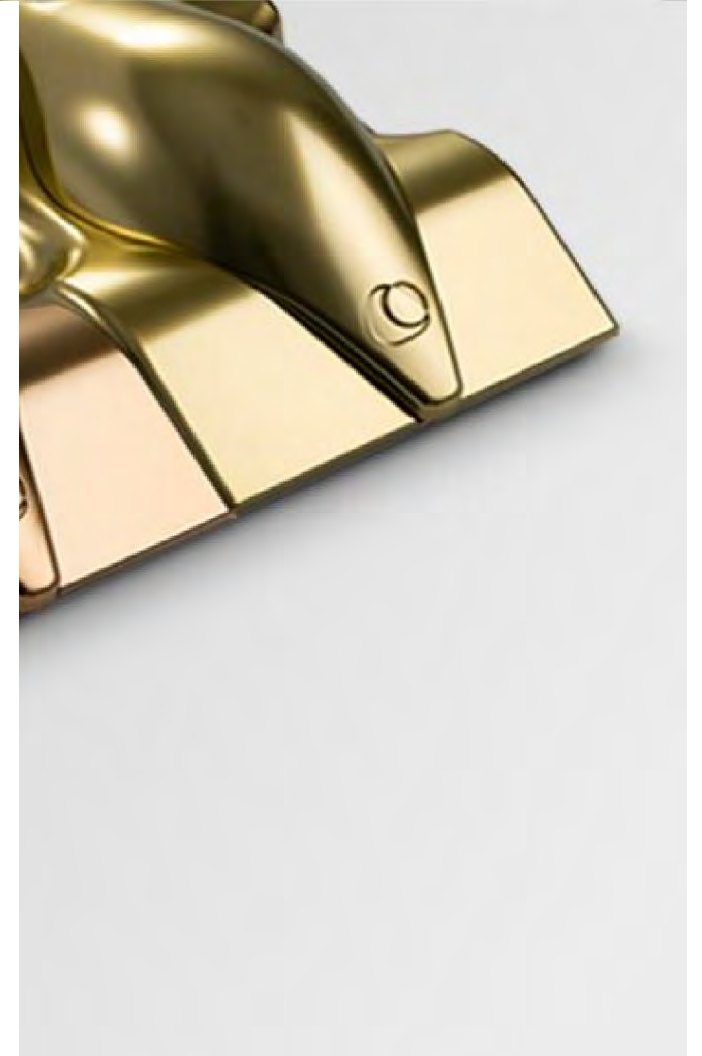
▶ Application fields

▶ Aluminum Pigment Reflectivity

▶ Exterior

▶ Interior

▶ Development





MILANO COLORI

Who We Are

Over the years Milano Colori has established its role as a leader and reference point in the Italian and European market for the distribution of chemicals raw materials and special chemicals for industrial use.

- **SUPPLIER OF MAIN ITALIAN PRODUCERS**
- **PARTNERSHIP WITH LEADING CHEMICAL MANUFACTURERS**
- **FOCUS ON INNOVATIVE PRODUCTS**
- **TECHNICAL AND COMMERCIAL CAPABILITIES**
- **EFFICIENT LOGISTICS MANAGEMENT**



MILANO COLORI

MILANO COLORI -Business Units



COATING, INKS, ADHESIVES
CONSTRUCTION



PERSONAL CARE



PLASTIC & RUBBER



HYGIENE &
DETERGENCY



INDUSTRIAL CHEMICALS



FOOD & FEED



MILANO COLORI

Our Business Model



ECKART Effect Pigments

Global Headquarters in Hartenstein



Hartenstein
in Bavaria

ECKART Effect Pigments

Product Range and Services

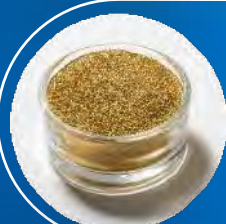
Pigments



Aluminum pigments



PVD aluminum pigments



Gold bronze pigments



Zinc pigments



Pearlescent pigments



Stainless steel flakes



Glass pearl pigments



Atomized metal powders

Forward Integration



Metallic inks



Metal pigment paints

Services



Metal pigment paints

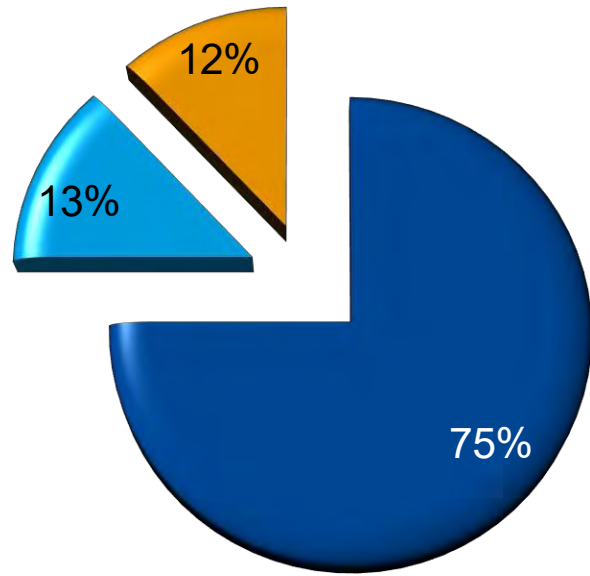


Bonding

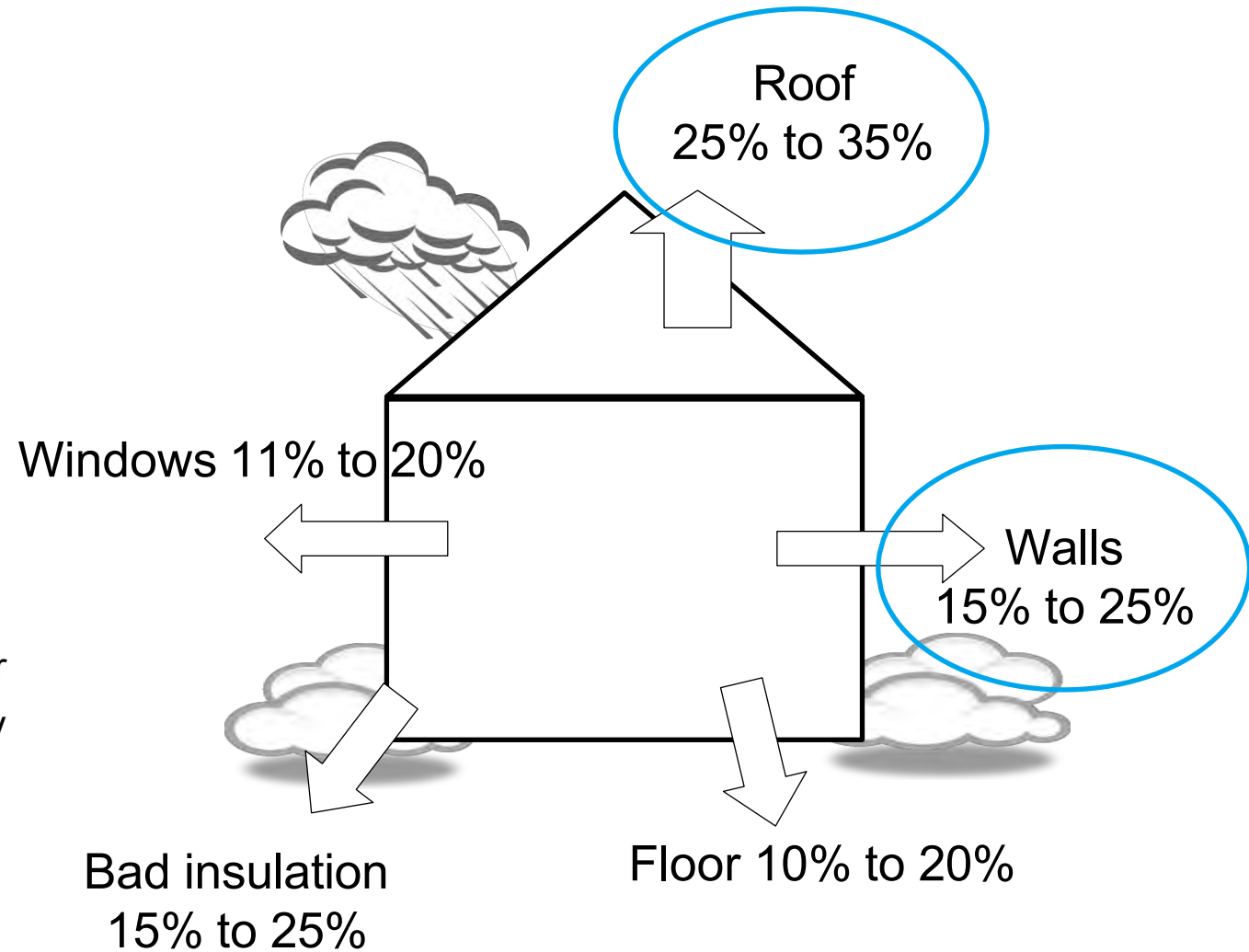


Aluminum pigments for Radiation Reflection Exterior & Interior

Energy Balance in Buildings



- Heating
- Hot water
- Electricity



Radiation Indoor vs. Outdoor

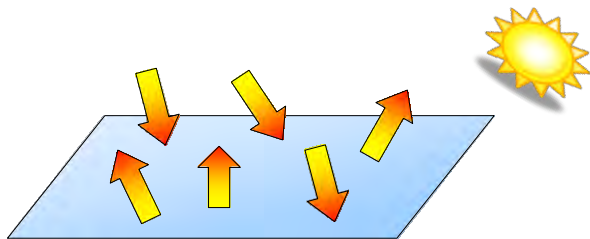
Exterior

Solar radiation

Spectrum UV / Visible / NIR

Desired functionality

- Reduction of heat inside the home through the reflection of heat towards the outside.



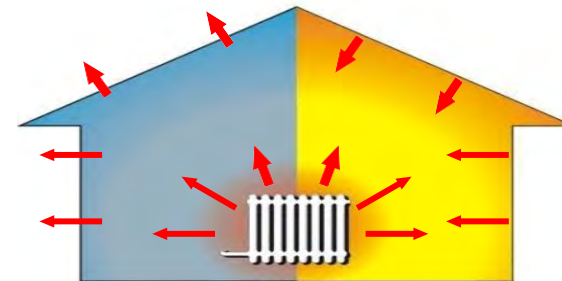
Interior

Thermal radiation

Objects such as radiators, walls, and humans emit **MIR** (20-100°C)

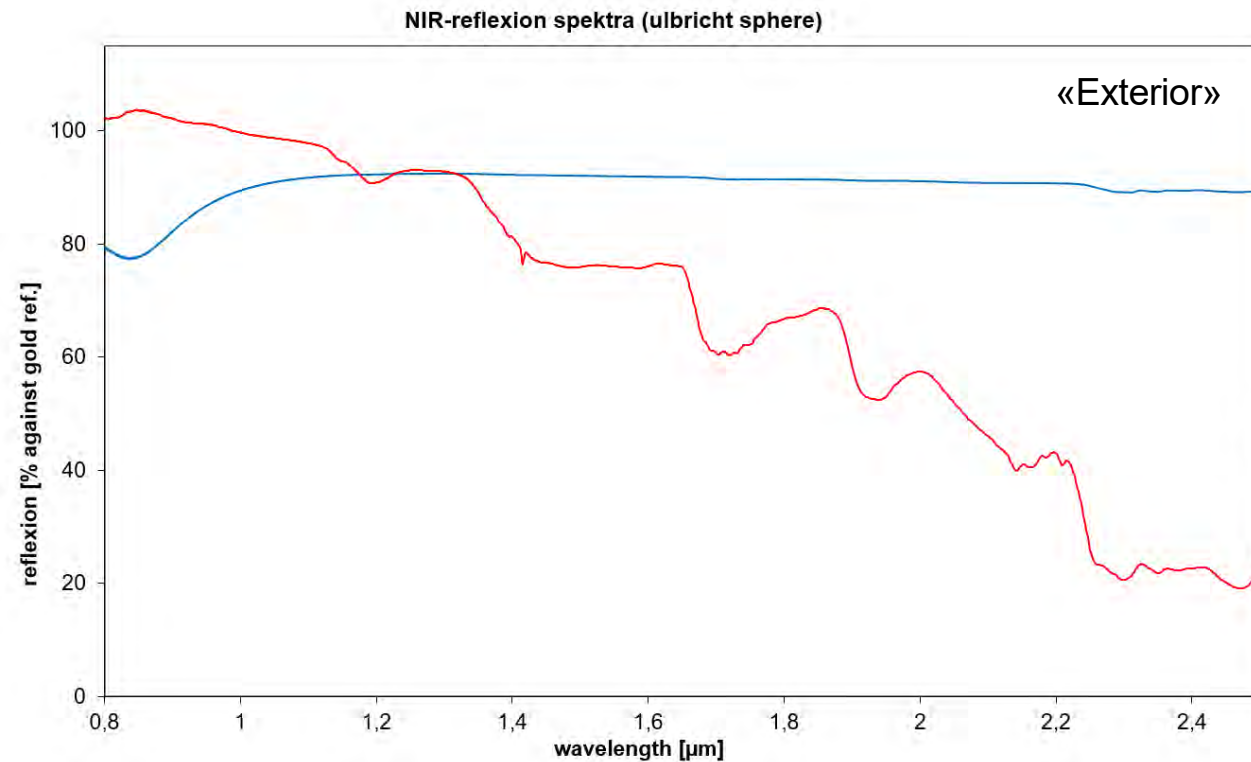
Desired functionality

- Reduction of energy consumption reflection of heat inwards.
- Thermal comfort.

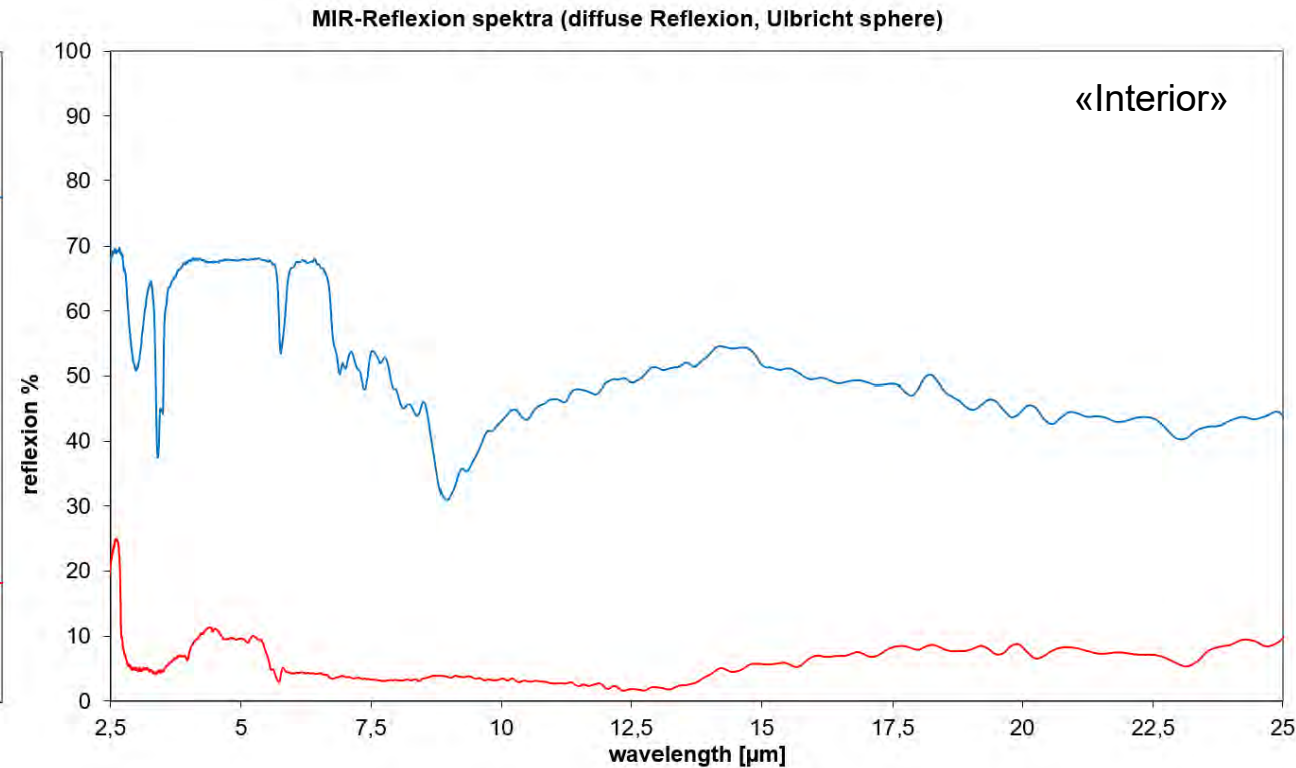


STAPA® Aluminium Flakes as „Reflectors“

- Aluminium provide high reflective properties across all wavelength in comparison to TiO_2
- Flake shaped particles work like a mirror and best suitable



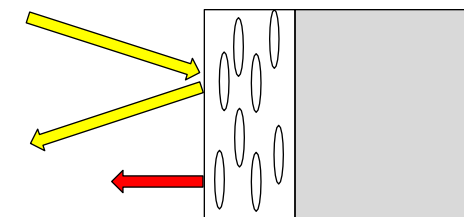
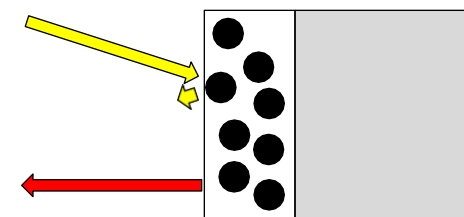
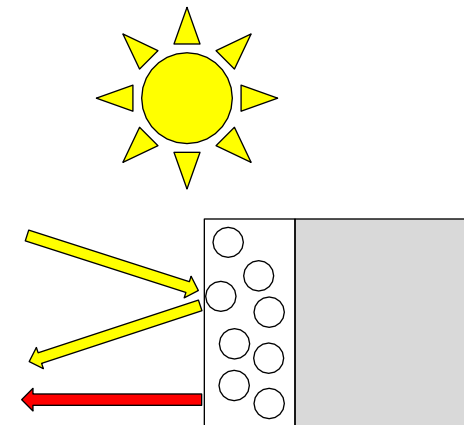
— Aluminum pigmentation



— TiO_2 pigmentation

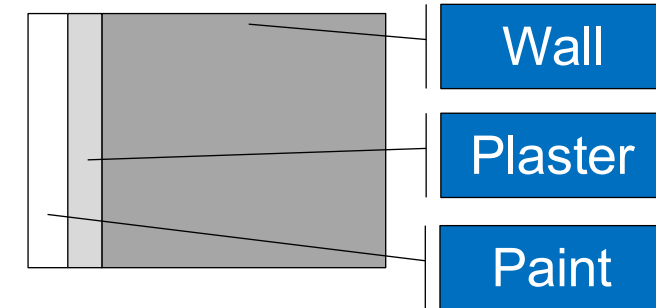
In Exterior Applications – Mode of Action

- Highly reflective (white) wall
sunlight is reflected; high emissivity $\varepsilon = 0,9$
wall gets cool
- High absorptive (black) wall
sunlight is absorbed; heat build-up; high emissivity $\varepsilon = 0,9$
cooling during night
- Low emissivity wall with „Aluminum Pigment“
low heat emission $\varepsilon = 0,3 - 0,7$ (depending on formulation)
no cooling; no algae / mildew

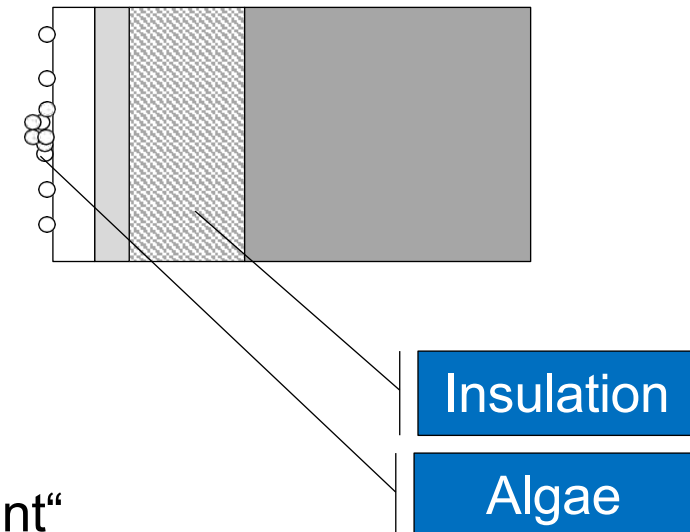


Outdoor: Growth of Algae and Mildew

Exterior wall without insulation (old buildings)
-> wall surface temperature higher than environment
-> no microbial attack



Energy efficient wall; perfectly insulated
-> wall surface temperature lower than environment
-> water condensation
-> microbial attack (algae / mildew formation)
and subsequent degradation



Use of toxic biocides is common (short term efficiency).
→ Long Term: Low emissivity paint with „Aluminum Pigment“

In Exterior Applications

- Preventing water condensation on the façade stops the growth of microorganisms.
- Exterior wall coat containing low emission paint containing Aluminum Pigments
- Low-emission paints retain more heat in the plaster and release it over a longer period of time.
- In this way the façade remains warmer reducing the formation of condensation water
- No formation of algae and mildew

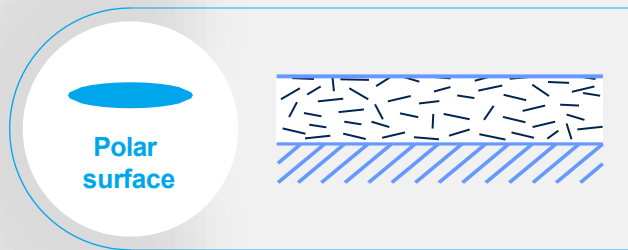
Fraunhofer Institute for Construction Physics

- Initial results confirm for low emissivity paint with significantly reduces water condensation on exterior walls.
- After 3 ½ years of exposure: no growth of algae and mildew while “normal” exterior walls displayed algae and mildew growth

Aluminum Pigment Characteristics

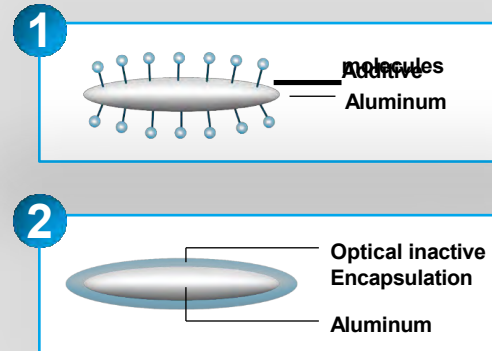
→ Application / Customers Choice

Non-leafing Pigments → SOLVENT BORNE & WATERBORNE (STABILIZED)

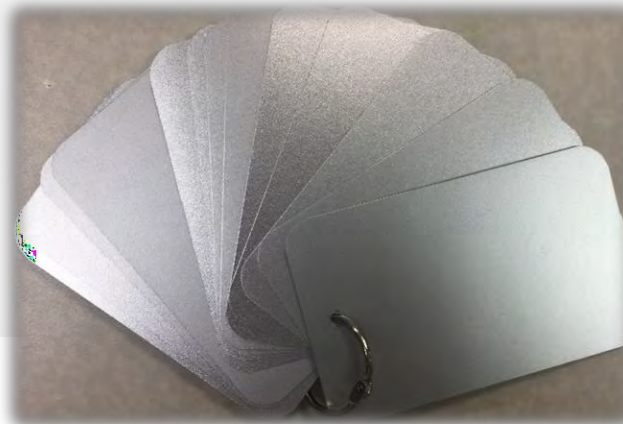


- Smooth effect
- No Mirror
- Good Adhesion
- Good Overcoating
- Good tinting properties

STAPA®
Metallic / Mobilux



STAPA® HYDROXAL E
STAPA® HYDROLAN



Leafing Pigments → SOLVENT BORNE



- Highly Reflective (Mirror effect)
 - Light
 - Heat
- Barrier Protection
 - Moisture
 - Oxygen
- Fair Overcoating

STAPA® LEAFING

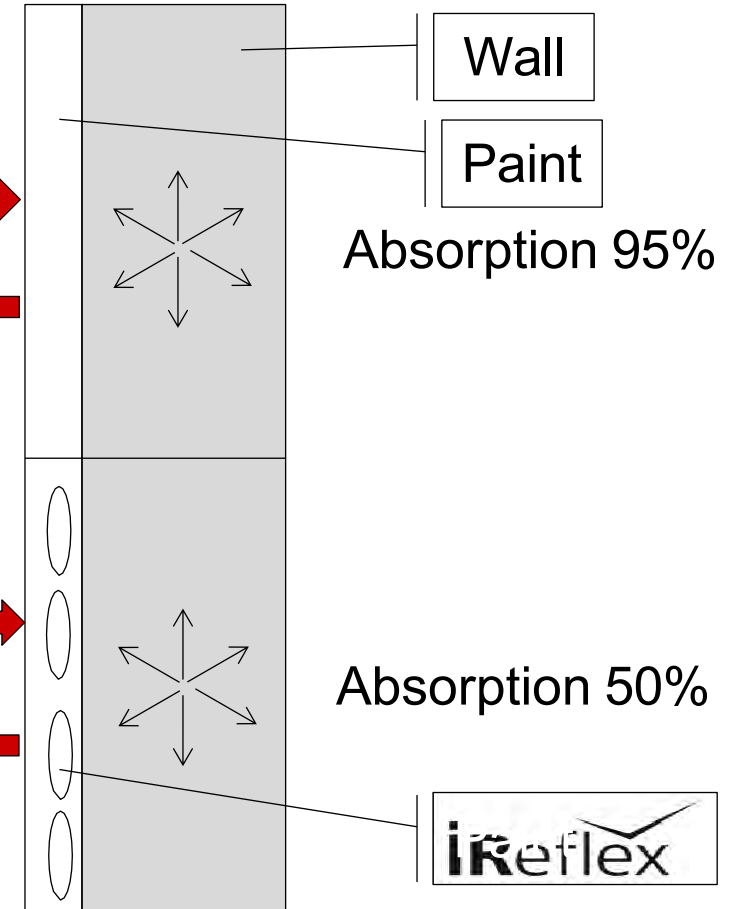
INTERIOR: ECKART Solution iReflex

Standard white paint

Thermal radiation



Reflection 5%



Paint containing iReflex

Thermal radiation



Reflection 50%

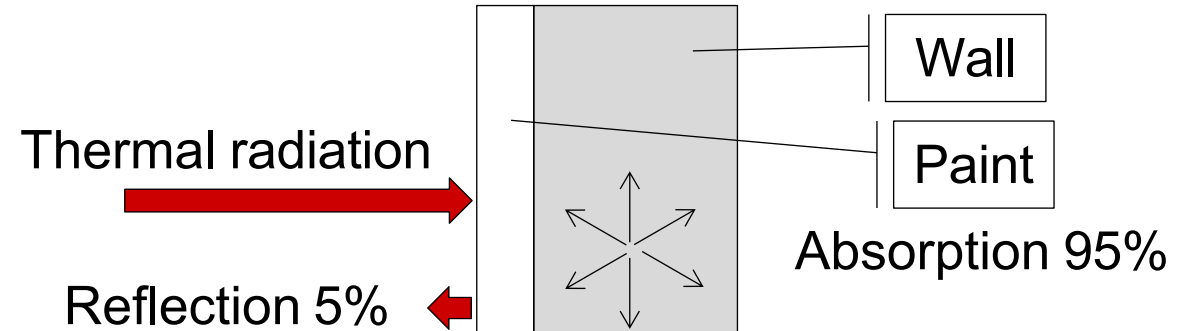


- Off white / no metallic character
- fully encapsulated aluminum powder
- Tintable

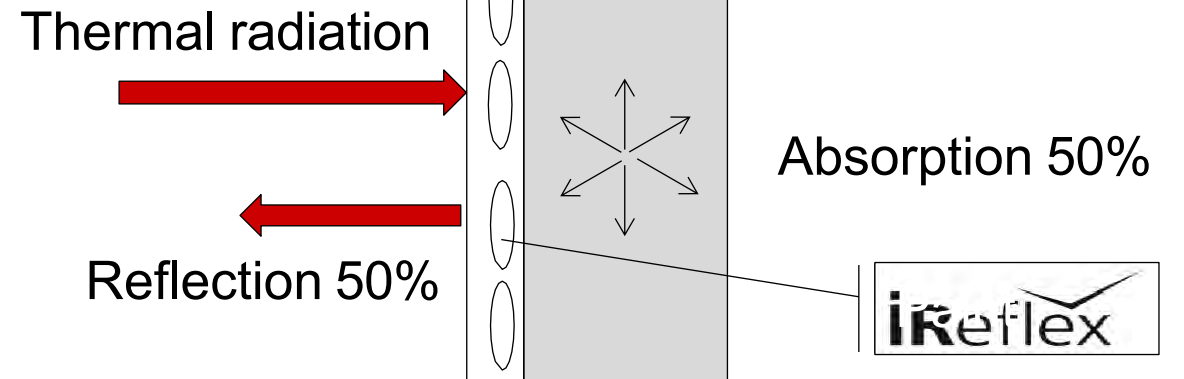


Reflectivity of Radiation; Interior

Standard white paint



Paint containing iReflex



Simulated room	Type of construction	Wall temperature inner side	Saving
two walls facing outside and ceiling	Old building	14,7 °C	22 %
	Building of the 1970	16,4 °C	19 %
	Passive House	19,6 °C	16 %
just a wall facing outside	Old building	14,7 °C	17 %
	Building of the 1970	16,4 °C	17 %



Bauhaus-
Universität
Weimar



Independent study conducted at BAUHAUS UNIVERSITY* in Weimar

*Faculty of Construction Physics.

- Inhouse application in air conditioned chamber
- "Feelix" wired with 7 km of electrical cables and sensors to mimic human body's thermal comfort
- Comparative testing standard white wall paint vs. iReflex containing wall paint

Test conditions:

- Underfloor heating
- Outside temperature: -5 °C
- Initial room temperature: +21 °C
- Painting: based on Shinedecor IReflex 5000 White with a 50% reflection value
- Feelix heat flow density: $q = 70.2 \text{ W/m}^2$ - Comfort point of an average human body

INTERIOR: Shinedecor – Effect Pigment Concentrates

Shinedecor is free of solvents and binders. It contains only the effect pigment, water and small quantities of wetting and dispersing additives, defoamers and rheology additives.



Properties:

- ready to use
- easy to use
- free of VOC, free of APEO, free of plasticizers
- high pigment loading
- excellent wetting properties
- excellent shear stability
- no sedimentation
- Suitable for automated dosing
- Shelf Life 12 months



Important things to know:

- Don't use high shear forces to incorporate our Shinedecors because this can destroy the metallic effect.
- We recommend to use at least 20% of Shinedecor in total formulation
- Depending on the required effect there can be used both, transparent wallpaints or colored wall paints (white Metallic).
- Shinedecor was originally developed for wallpaints, but can be used in every waterbased paint system (but this should be tested for compatibility before)

ECKART Effect Pigments

Dust-free, Low-VOC Pigment Preparation - VERSALAN

NEWEST
DEVELOPMENT



Discover the Revolution in Pigment Technology

Encapsulated pigments for waterborne coatings are our strength - for decades!

Our newest pigment development – a dust-free, low-VOC preparation, made from pure aluminum with an inorganic coating:

- **Environmentally Friendly:** With a VOC content of less than 5%, it meets the latest regulatory requirements.
- **Dust-Free:** The preparation is dust-free and contains no additional binder system.
- **Versatile:** Suitable for water- and solvent-borne binder systems. It is easy to disperse and offers improved wetting properties.
- **Excellent Coverage:** Thanks to the latest STAPA® HYDROLAN® technology as base, it provides high gassing and chemical resistance.
- **Regulatory Benefits:** It is not classified as hazardous material, does not require separate storage and meets the requirements of the 4.1 burn test.



MILANO COLORI



Contatti

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