



WACKER **SILICONES**

SILICONES IN MASONARY PROTECTION

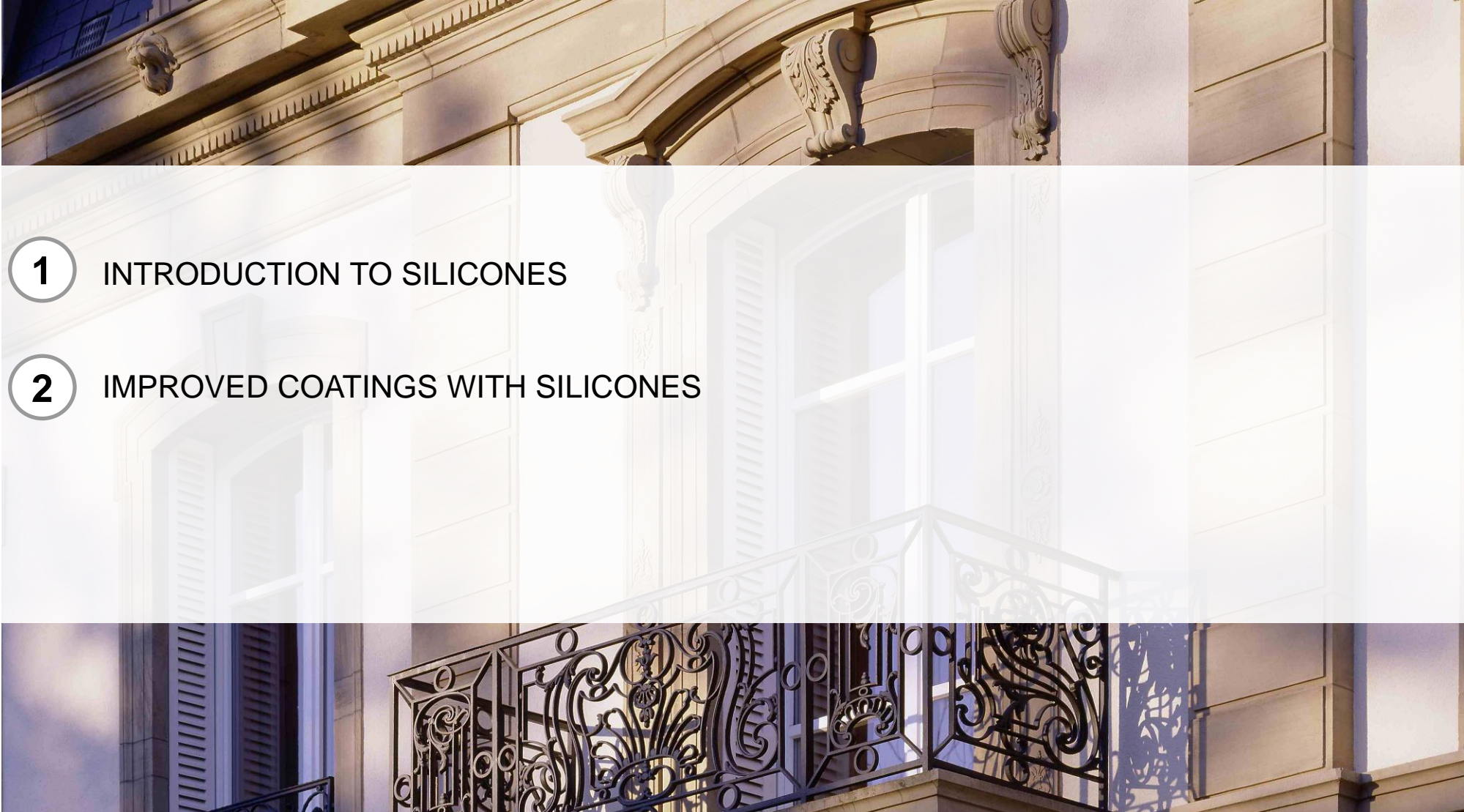
ANOOP D'SOUZA, CONSTRUCTION CHEMICALS

OCT, 2012

CREATING TOMORROW'S SOLUTIONS

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- Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.
- Learning Objectives:
 - Demonstrate the advantages of using silicon in improving the life cycles of the paints.
 - Introducing the concept of building protection using silicon resin paints

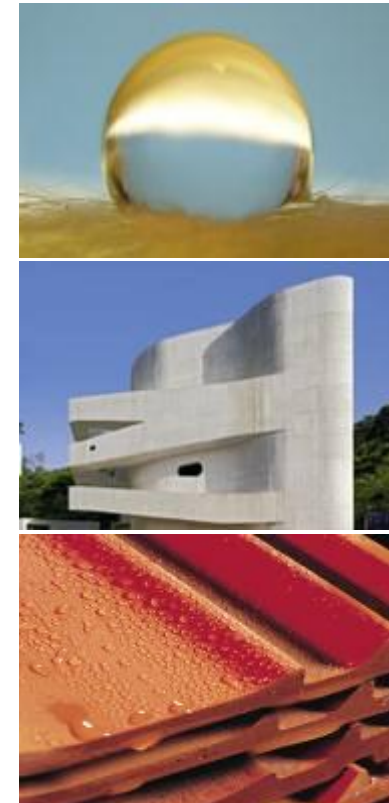
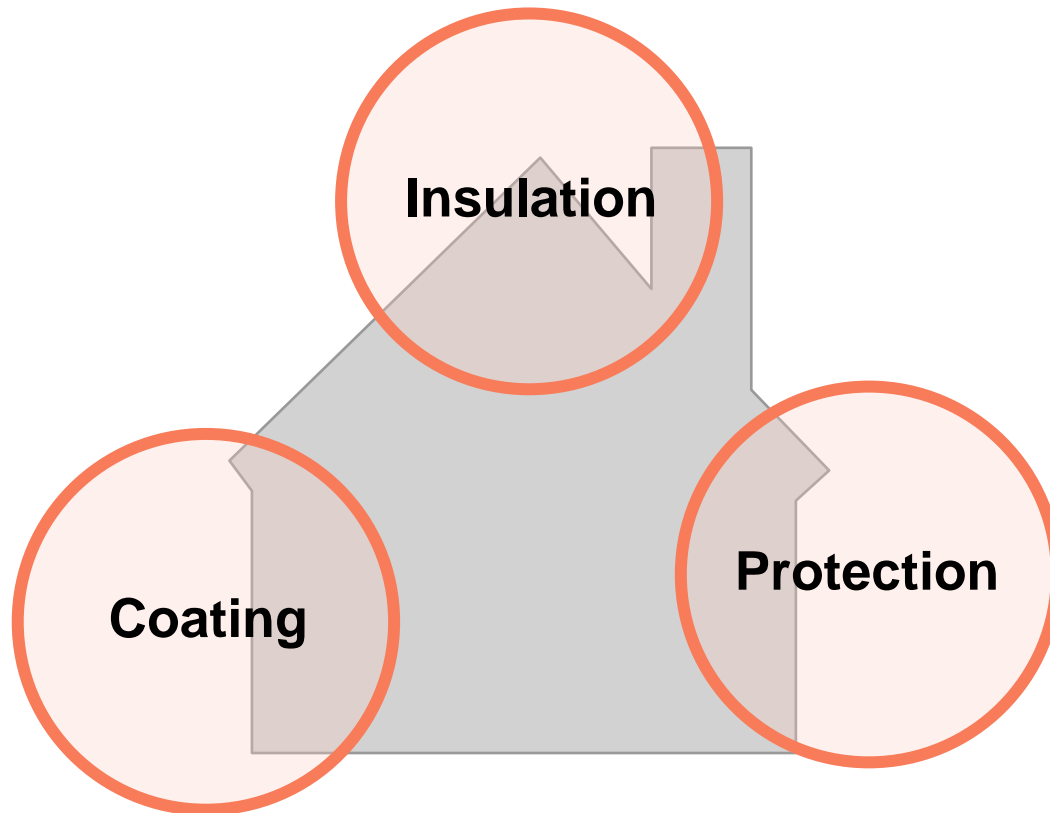
AGENDA

- 
- 1 INTRODUCTION TO SILICONES
 - 2 IMPROVED COATINGS WITH SILICONES

SILICONES : VERSATILITY & HIGH PERFORMANCE

- Family of High Performance Polymers
- Extraordinarily versatile , specialty products which brings benefits throughout modern life :
- Transport
- Electronics
- Personal care
- Paper and pulp processing
- Plastics
- Sealant and Adhesives
- Textiles
- Construction (Building and Coating)

CONSTRUCTION CHEMICALS' EXCELLENCE IN BUILDING - THREE CORE EFFECTS



TAKE ADVANTAGE OF OUR ENTIRE CONSTRUCTION EXPERTISE

▪ Walls

- Primers

▪ Floors

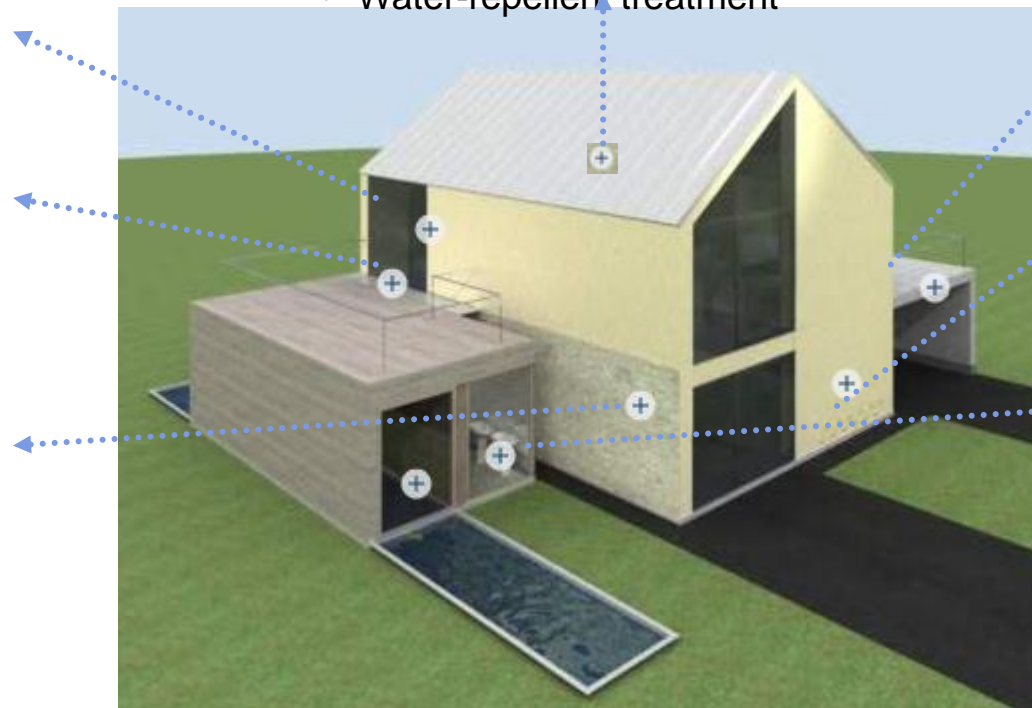
- Easy-to-Clean

▪ Facades

- Paints
- Plasters
- Primers
- Water-repellent treatment

▪ Roofs

- Water-repellent treatment



▪ Concrete

- Mass impregnation
- Water-repellent treatment

▪ Masonry / Cellars

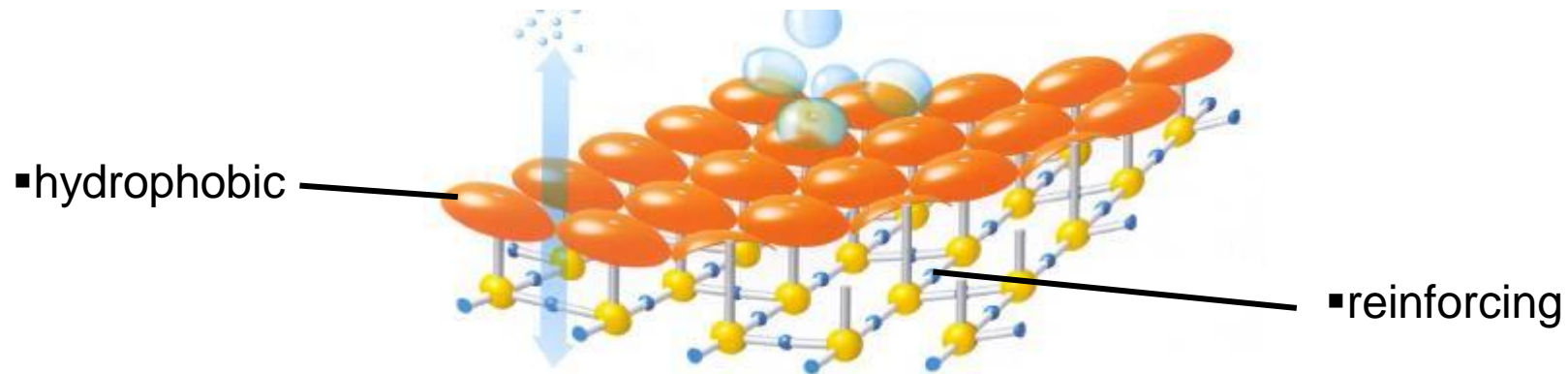
- Masonry damp-proofing

▪ Wet areas

- Gypsum applications
- Primers

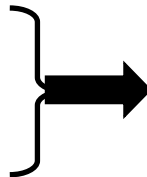
CORE COMPETENCE: SILRES® BS FOR DURABLE WATER REPELLENCY BASED ON SILICONE-RESIN-NETWORKS

- SILRES® BS provide durable water repellency by forming hydrophobic, reinforcing silicone resin networks



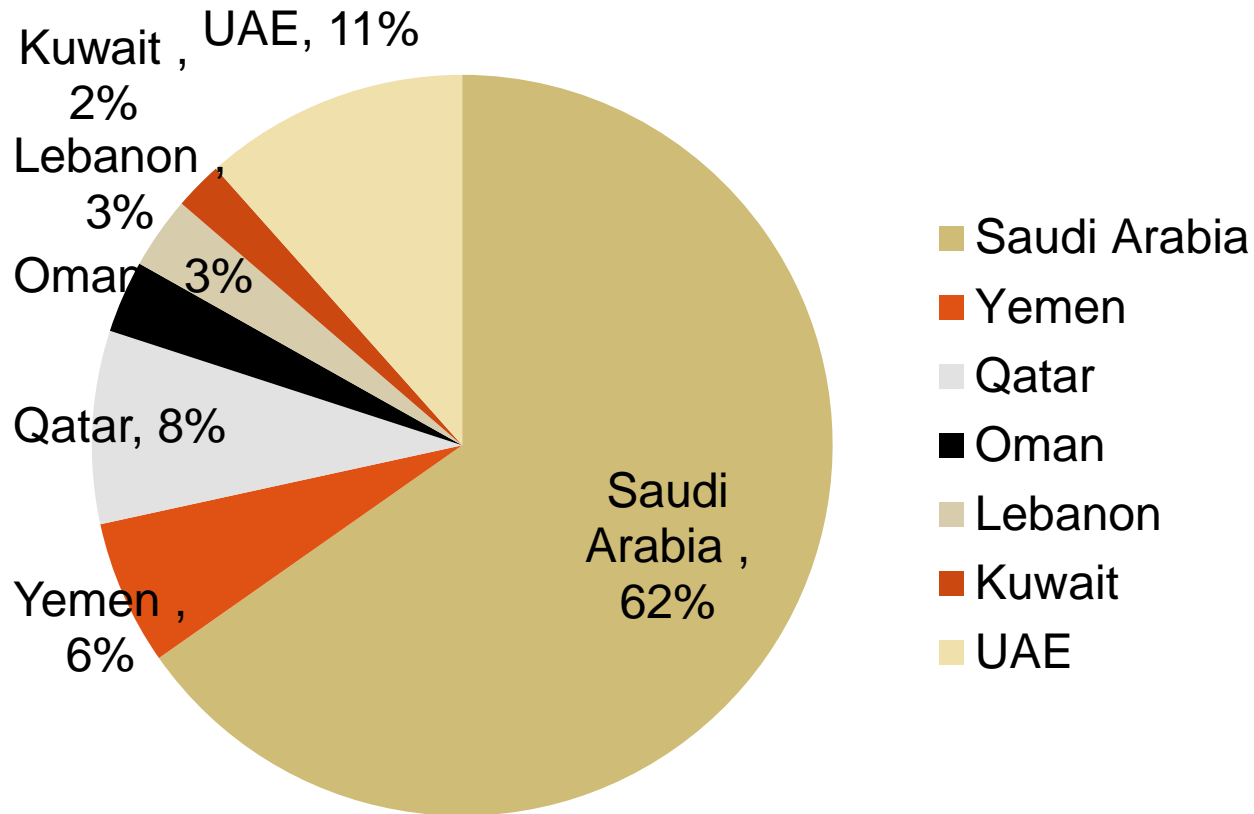
▪ protecting effects of si resin network:

- water repellency
- water vapour permeability
- weatherability



- reduced dirt pick-up and easy cleanability
- reinforcing and durable
- excellent preservation properties
- reduced microorganism growth

PAINT CONSUMPTION IN THE MIDDLE EAST



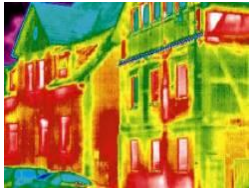
- Consumption highest in Saudi Arabia ,
- Paint Demand nearly 900 K tons

Source: IRL

NEW CONSTRUCTION HAVE BEEN THE MAIN GROWTH DRIVERS OF RECENT YEARS

- New construction
- Renovation and maintenance
- Government spending
- Sustainability
- Regulation and standards

CURRENT MARKET TRENDS IN EXTERIOR COATINGS



- Energy saving



Hydroaktive Dämmsysteme
Innovative Wege ohne Biozide

- Hydroactive/hydrophilic vs hydrophobic coating systems



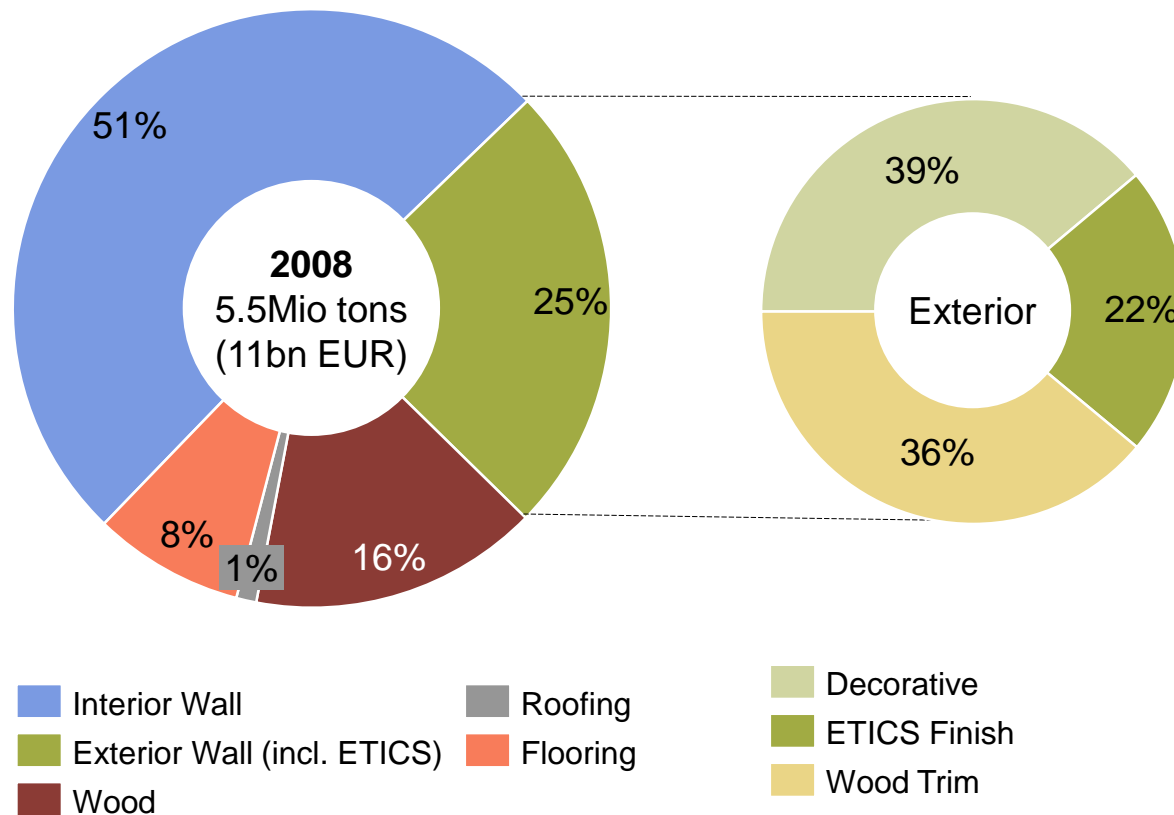
- Elastomeric coatings (e.g. anti carbonation technology)



- Sustainability (less harmful substances, e.g. biozides, VOC, solvent,...)

IN EUROPE 25% OF PAINTS GO INTO THE EXTERIOR

Architectural Coatings Demand in EUROPE (volume*)

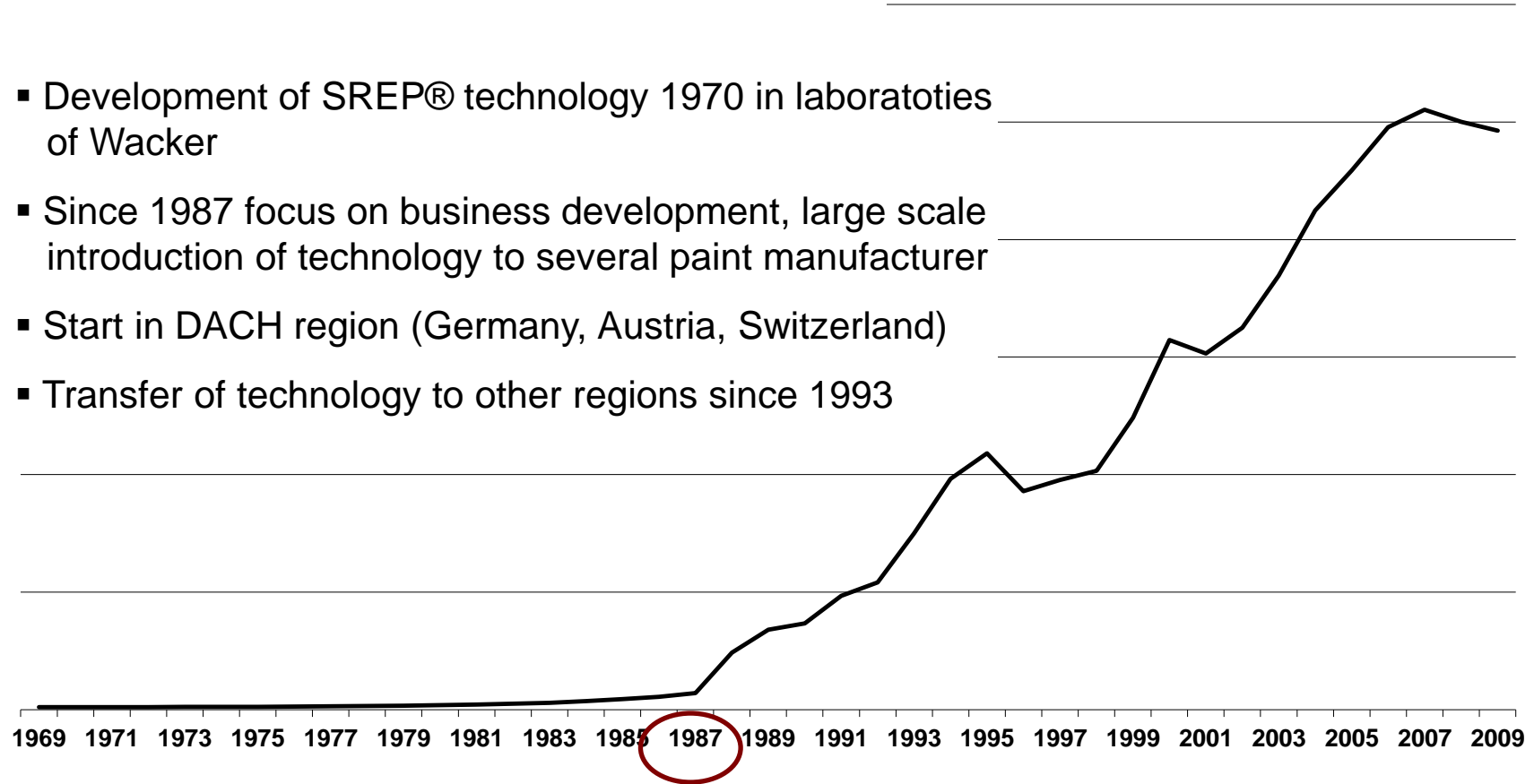


*Source: Irfab 2008-2018

IN THE LAST 20 YEARS, SILICONE PAINTS HAVE BEEN ESTABLISHED IN EUROPE

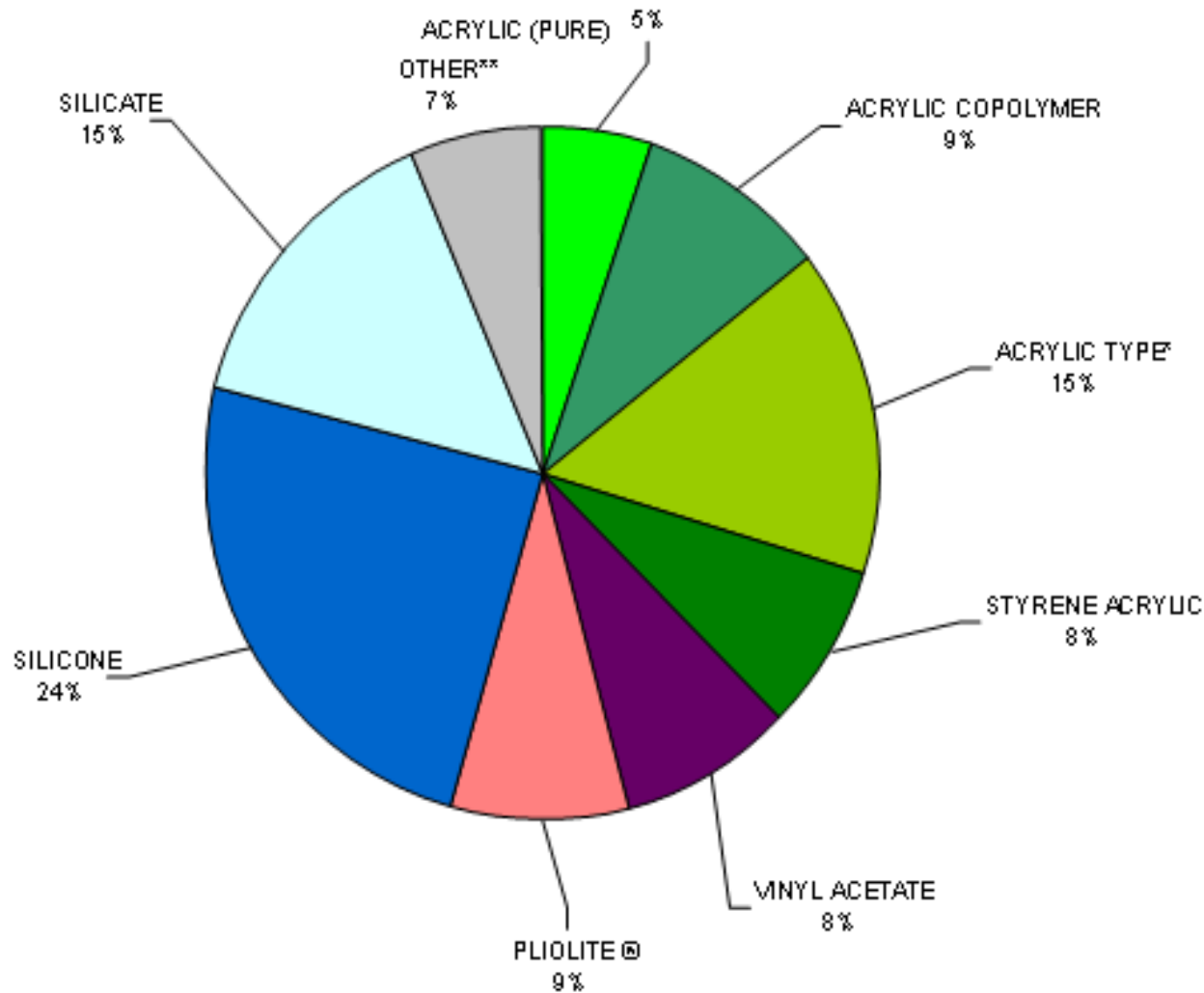
Growth of Silicone Paint market in Europe

- Development of SREP® technology 1970 in laboratories of Wacker
- Since 1987 focus on business development, large scale introduction of technology to several paint manufacturer
- Start in DACH region (Germany, Austria, Switzerland)
- Transfer of technology to other regions since 1993



Source: Wacker estimate

EVERY 4TH TOP BRAND OF THE EUROPEAN FACADE PAINTS IS LINKED TO SILICONES



Source: Irfab

TO PROMOTE THE CONCEPT OF SILICONE PAINTS WE INITIATED AN INDUSTRY PLATFORM

We help facades!

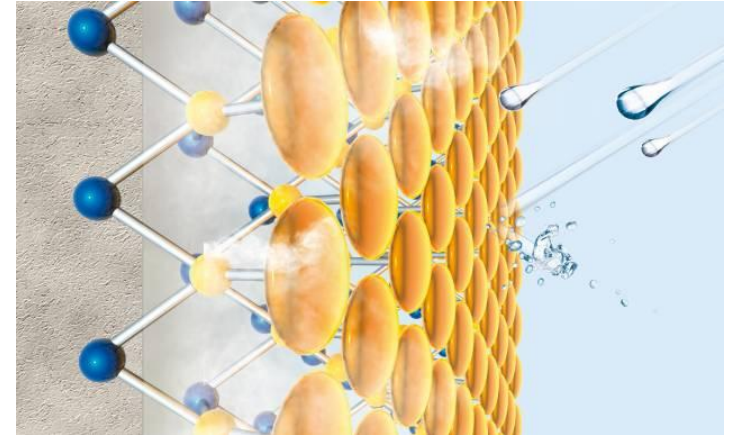
- A joint initiative of WACKER SILICONES and leading paint manufacturers
- www.srep.com



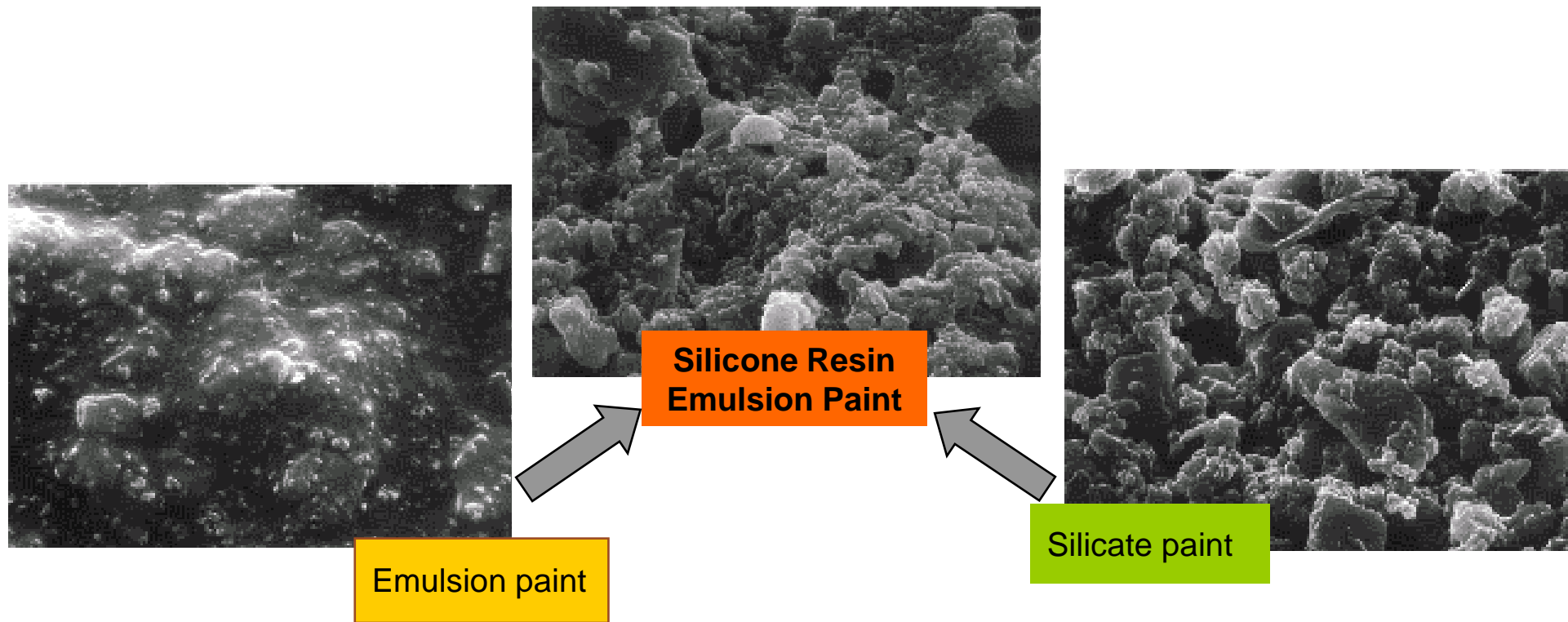
THE BENEFITS OF SILICONES IN PAINTS: QUALITY & DURABILITY

SREP aims at life cycle optimization

- High quality masonry paints
 - WATER REPELLENCY
 - WATER VAPOUR PERMEABILITY
 - UV-RESISTANCE
- Sustainability & durability
- Reduction of life cycle cost
(less renovations)

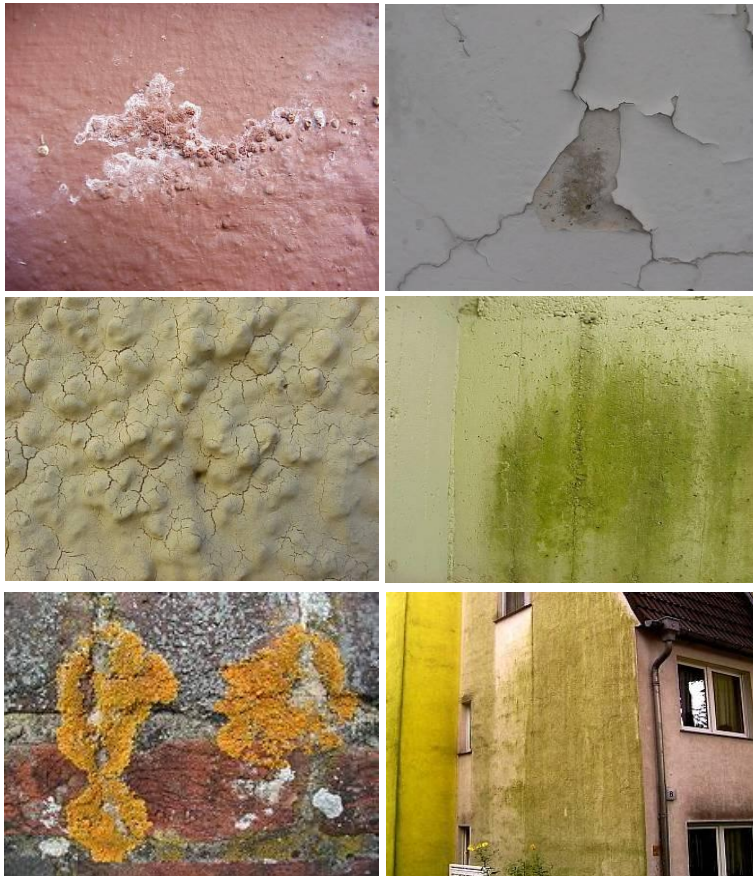


SILICONE RESIN PAINTS COMBINE THE ADVANTAGES OF EMULSION AND SILICATE PAINTS



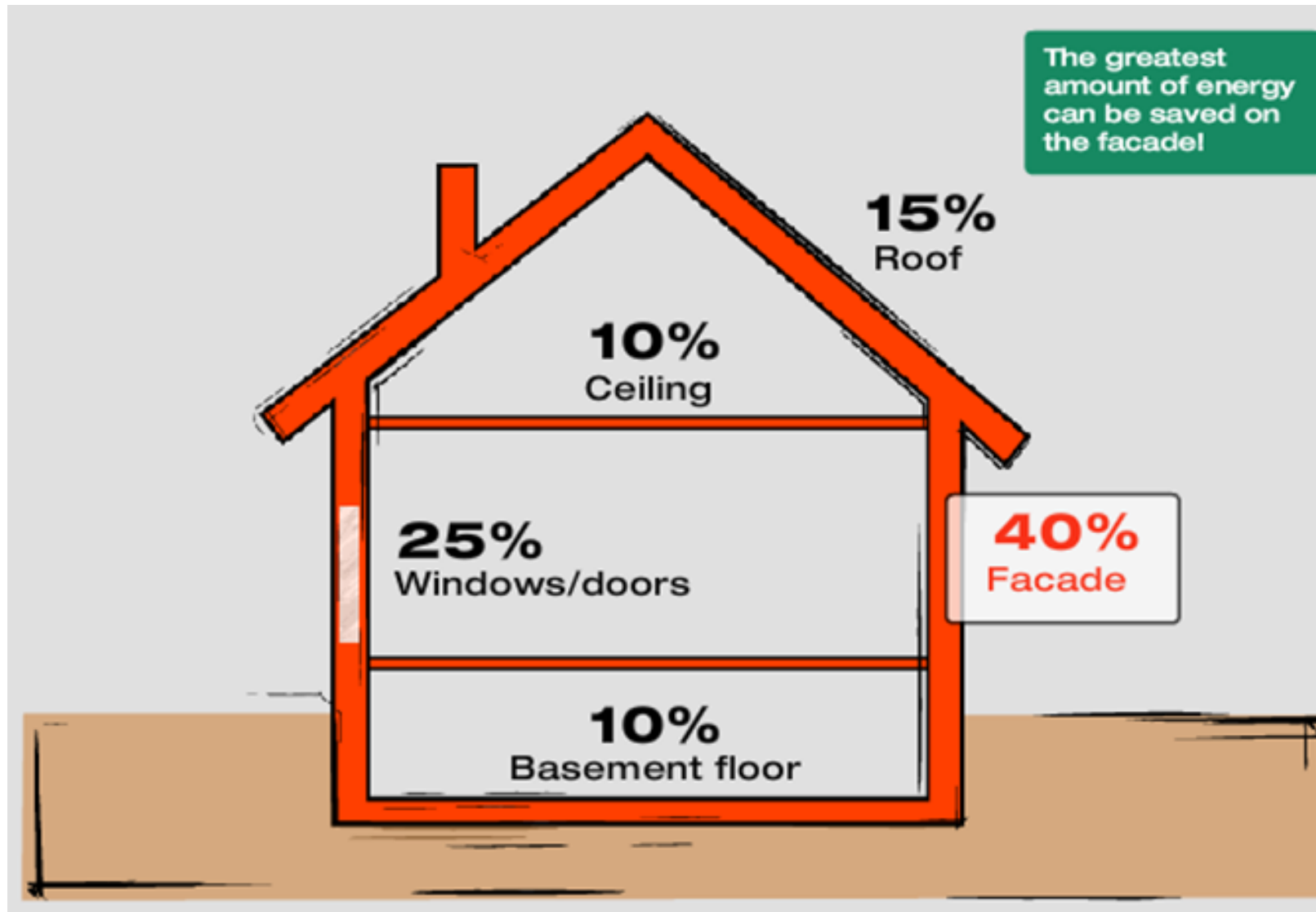
Water permeability:	low	low	very high
Water vapour diffusion:	low	very high	very high

SILICONE RESIN EMULSION PAINTS – PROTECT YOUR BUILDING LONGTERM



- No penetration of moisture into the masonry
- No penetration of dirt
- No damages of the structure
- No costs of mending/repairing
- Retaining a building's value
- Renovation only approx. every 15 years

FACADES ARE THE MOST CRITICAL PART OF A BUILDING

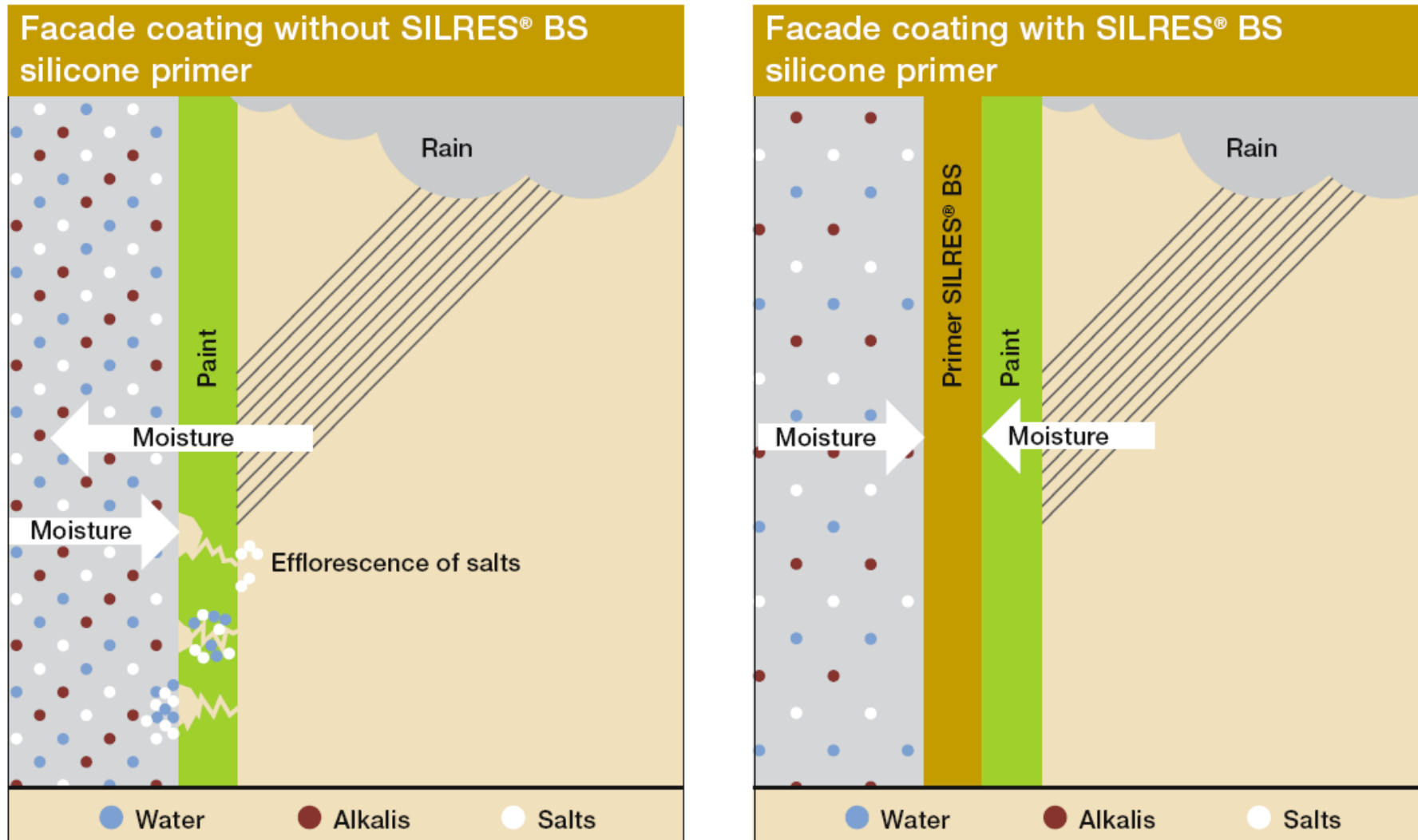


THERE ARE THREE APPROACHES FOR SILICONES IN EXTERIOR FACADE APPLICATIONS

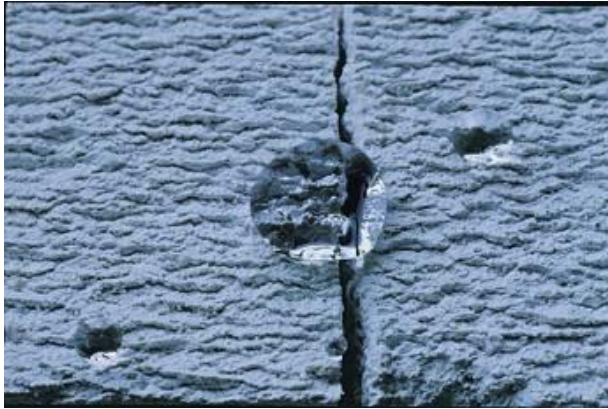
Exterior facade applications with silicones

- 1. Primer:** first coat, applied directly onto the substrate
- 2. Additives:** reducing water uptake, display beading
- 3. Binders & Additives:** substitute organic binder for water permeability

HIGH PERFORMANCE PRIMERS CAN UPGRADE THE ENTIRE COATINGS SYSTEM



EFFECTS OF PRIMING WITH SILRES® BS SILICONES



Inactivation of cracks with SILRES® BS silicone primer

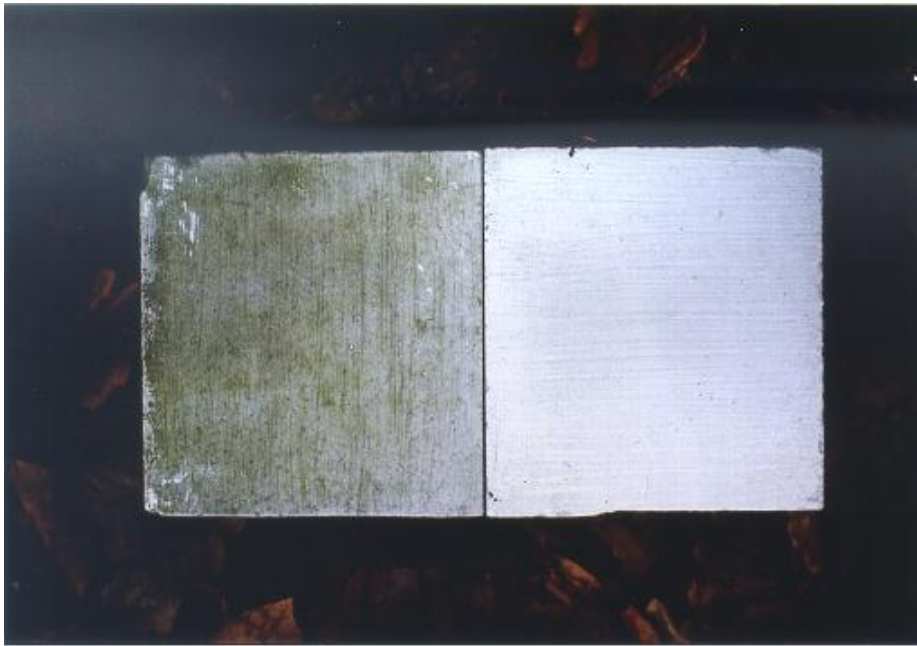


Cohesive failure after adhesion tests

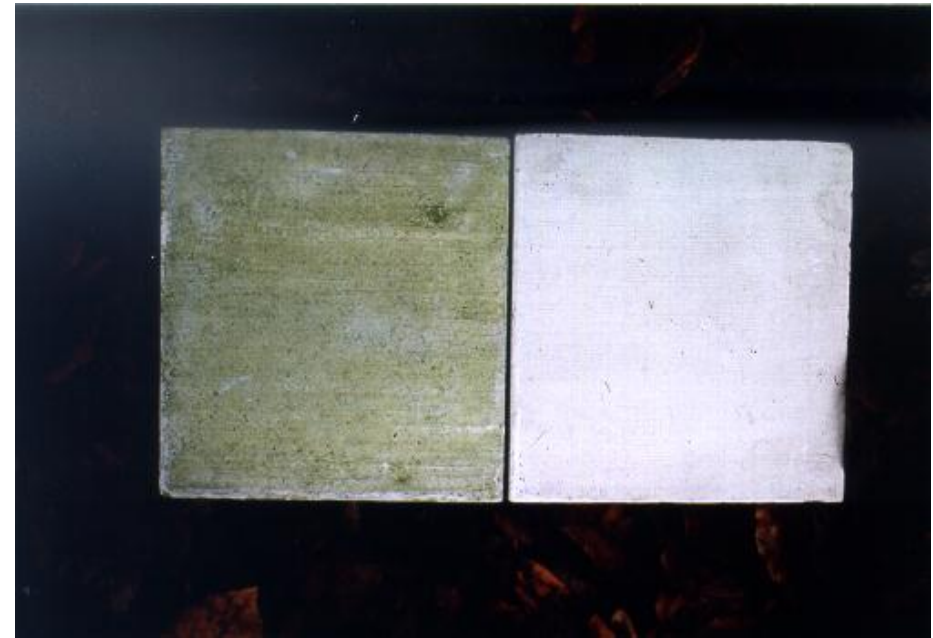
- ▶ Formation of hydrophobic zone
- ▶ Enables regular film formation of the paint
- ▶ Gas permeability
- ▶ Increasing paint adhesion
- ▶ Suppresses efflorescence
- ▶ Dry & stable substrate

ADDITIVES CAN SIGNIFICANTLY IMPROVE THE QUALITY OF PAINTS

Effects of water repellent additive after 1 year outdoor exposure



Silicate emulsion paint without / with 1% silicone additive



White-wash emulsion paint without / with 2% silicone additive

AGAINST POPULAR BELIEF: SILICONE RESIN EMULSION PAINT NOT NECESSARILY MORE EXPANSIVE

Upgrade your formulation with few adaptations

- overcritical PVC (=> reduce organic binder)
- add Silicone binder (~4%)
- add Silicone additive (~1%), if beading is required
- TiO₂ content reduced & partial replacement with cheaper fillers (reason: hiding improves with increasing PVC)

➔ minor price difference for SREP[®] based paint

➔ significant improvement of

- weathering/UV stability
- water vapour permeability
- water uptake (longterm)
- beading

IMPREGNATING AGENTS: REFERENCE OBJECTS

Lime finish surface treated 1954



Treatment with silicone water repellent in 1954



assessment with Karsten tubes in 2007:
treated surface area still fully water repellent

Over 50 years old !!!

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▪Silicones in masonry protection

▪Anoop D'Souza, Construction Chemicals, 11th October 2010, Slide 23

REFERENCE OBJECTS AROUND THE WORLD



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'ALTE HEIDE' ELEMENTARY SCHOOL, MUNICH- FRÖTTMANING APPLICATION OF A SREP IN 1975 / 1976

Built:

1927

Location:

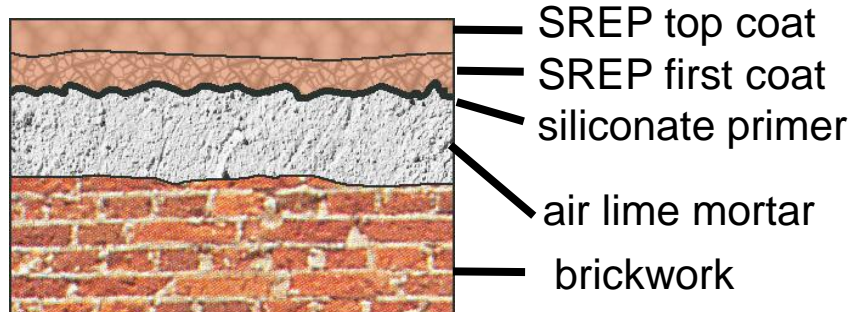
closed to the highway,
very dusty environment

Characteristic:

Brickwork with air lime mortar,
extremely rough plaster surface

Evaluation 2001:

Very good water repellency
excellent weather protection



LUISENGYMNASIUM (SECONDARY SCHOOL), CENTRAL MUNICH APPLICATION OF A SREP IN 1990

Built:

1900

Location:

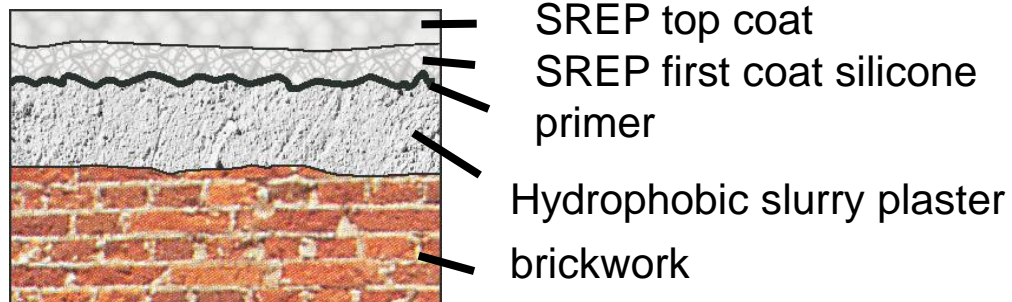
close to the central station,
very dusty, dirty and heavily frequented
street

Characteristic:

3-5mm thin lime slurry plaster,
decorative gables highly exposed to water

Evaluation 2001:

Excellent water proofing; no frost damages



RESIDENTIAL AREA, MUNICH-NEUPERLACH APPLICATION OF A SREP IN 1988

Built:

1960

Location:

outskirts of the district,
highly frequented streets

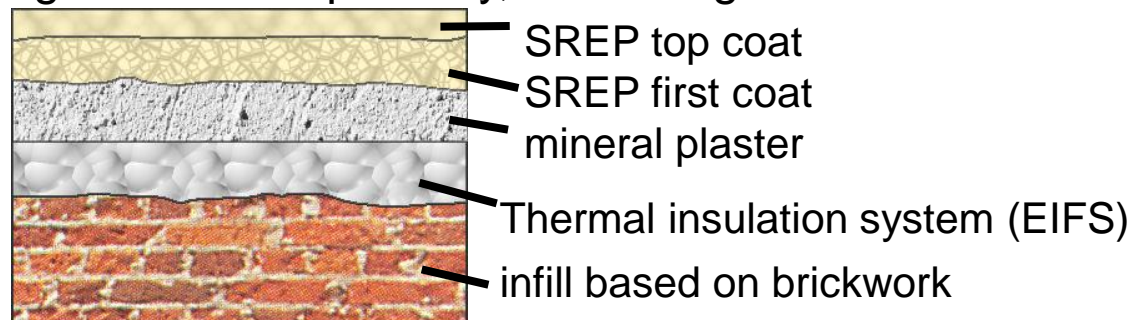
Characteristic:

Concrete skeleton structure + brick infill,
EIFS, mineral plaster

Evaluation 2002:

no microorganisms

good water repellency, no damage



ST. LAURENZEN-CHURCH, ST. GALLEN - SWITZERLAND

SREP® APPLIED ON RENDERED AREAS IN 1979

Built:

9. century. till 1420

Location:

city centre

Characteristic:

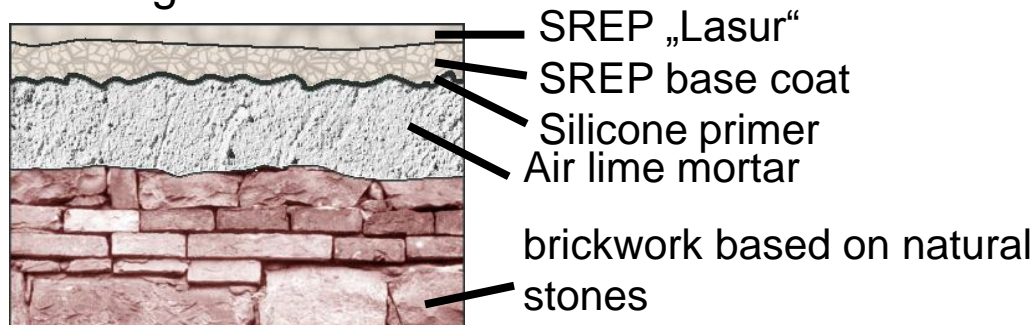
Air-lime render

Top coat with translucent SREP „Lasur“

Evaluation 1989/ 2000:

Excellent water repellency

for the first time 23 years without damage



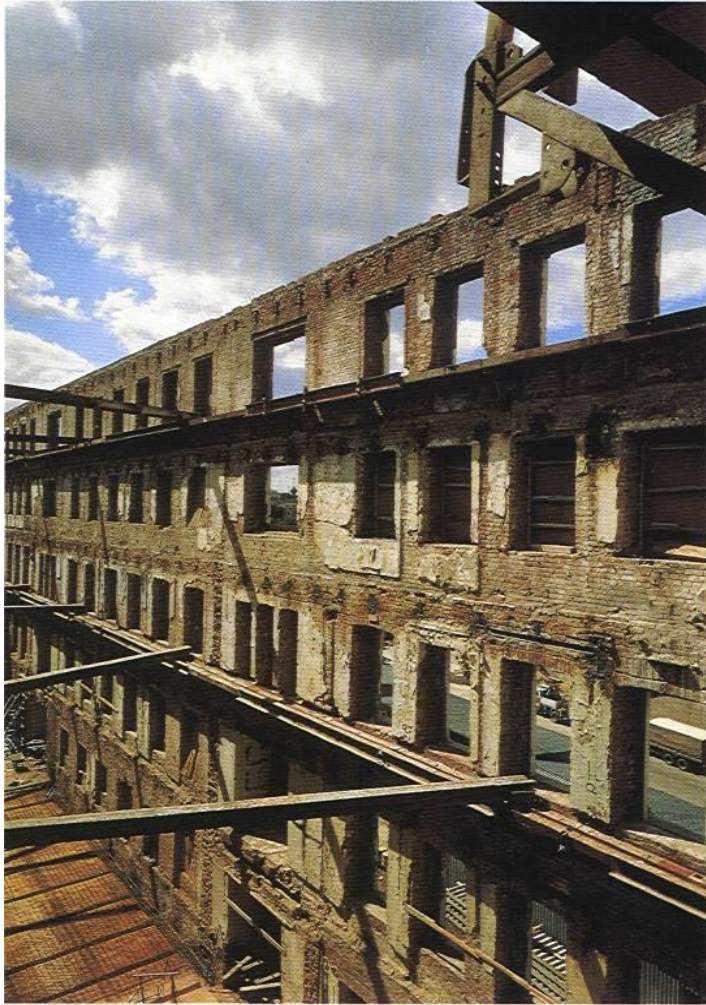
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RESTORATION OF HOTEL BALTSCHUG-KEMPINSKI, MOSCOW 1989



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HOTEL BALTSCHUG-KEMPINSKI, MOSCOW COATED WITH SREP® IN 1990



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MOSCOW, THE KREMLIN, CATHEDRAL OF THE ARCHANGEL MICHAEL, COATED WITH SREP® IN 1993



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STONE STRENGTHENING AT IT'S BEST SILRES® BS OH 100 RESISTS THE TOOTH OF TIME



SILRES® BS OH 100:

- Formation of a new weathering-resistant mineral binder
- no incrustation, but formation of a uniform consolidation profile across the cross-section of the natural stone
- good penetration depth into the natural stone
- no formation of a salt by product
- retains stone microstructure, gas and water vapor permeability, mechanical thermal and hygric properties
- reduction of the stone's absorption of water and other harmful substances
- suitable for absorbent, porous stone types

STONE STRENGTHENING RENOWNED REFERENCE OBJECTS



Babylonian clay
tablet

Rock Buddhas, Usuki,
Japan



Holy Trinity column,
Veszprém



Alte Pinakothek,
international art gallery,
Munich



Silicones in masonry protection

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SILICONE PAINTS ARE USED EVERYWHERE: RESIDENTIAL, MODERN CONSTRUCTION & HERITAGE



modern construction

Heritage



Residential



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