



EFFICIENZA & EFFICACIA



Roof Renovation and Cool Roofing with Silicone Coatings

Ir. Pepijn van Iersel

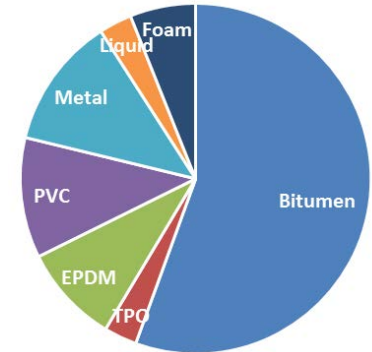
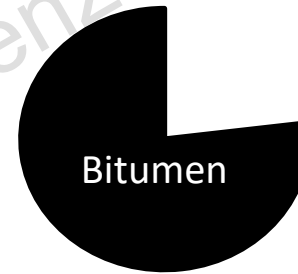
Outline

1. Market Trends in Roofing
2. What is Silicone – Typical Properties
3. Silicone Coatings – Key Take Aways
4. New Roofing and Renovation
5. Cool roofing
6. Conclusion

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Market Trends in Roofing

- Market is accepting new roofing solutions: they are needed !
 - Longer life, less failures
 - Healthier
Low VOC, low odour, safe to use
 - Eco friendly
Insulation, heat reflection
 - Smarter, easier products
No errors, less disposal
 - Lower labour cost,
Lower TCO (Total Cost of Ownership)



Better & New Roofing Materials

- PU Foam growing – spray and panels
- Improved PVC membrane
- Liquid applied Coatings/Membranes:
 - Acrylic, PU, Polyurea Coatings
 - **New in Europe: 100% Neutral Silicone Coatings**

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What is Silicone?

- Silicone applications:
 - Skyscrapers – The only material allowed to bond glass to facades
 - Electronics – Heat resistant protection against moisture & dust
 - Storage tank coating – Protection against UV and Corrosion
 - Rocket launch pad – Protection of concrete against rocket blast



What is Silicone?

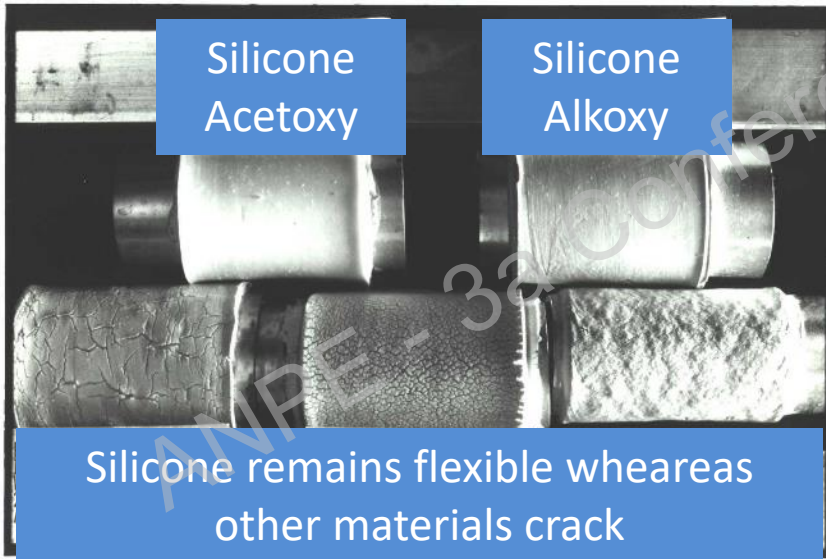


- Made from sand, not oil !
- No hazard labels – safe for workers
- Very low VOC

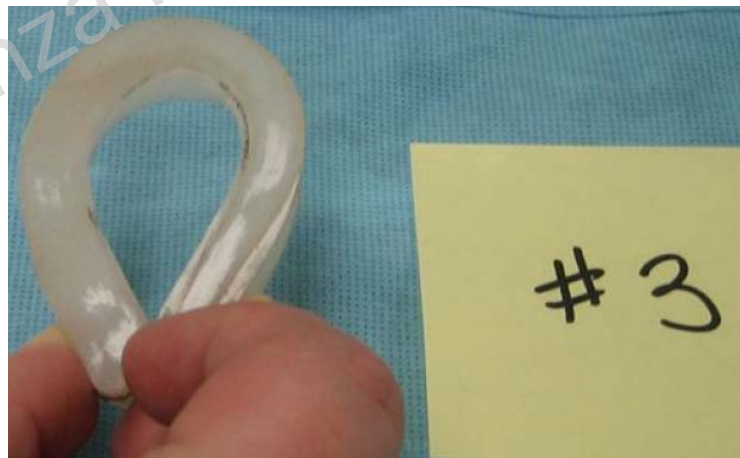
Typical Properties of Silicone

- **Silicone is more UV stable than any other building material**
- **Silicone remains elastomeric, also at low temperatures**

Cold bend test after 4000 hrs UV-exposure at -25°C

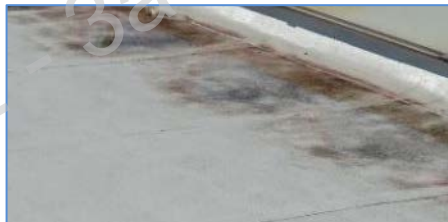
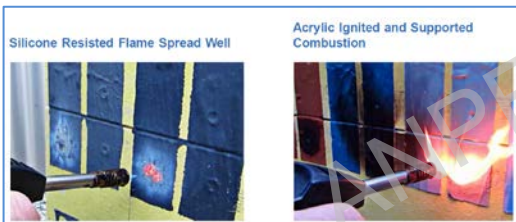


Flexibility test after 30 years Florida Weathering



Other properties of Silicone Coating

- **Proven system**
 - 50 year experience in USA, 25 year in UK, 15 year in Latin America
- **Performance**
 - **UV stable (better than UV resistant)**
 - **Permanently flexible**
 - Waterproof
 - Vapor permeable
 - Resistant to ponding water
 - Does not freeze (low temp application)
 - Rain-ready
 - Not combustible / Fire Rated
- **Easy to apply**
 - **One coat application**
 - Primerless adhesion to almost all roofing substrates
 - One component (no mixing)
 - Spray, brush or roller applied
 - Fast working around roof details
- **Energy saving**
 - **High reflectivity & emissivity**
 - Lower airco energy consumption
 - Higher yield of solar panels
 - Longer roof life
 - Cool roof rating council certified
- **Green product & safe to use**
 - **Very low VOC**
 - Sand based, not oil based
 - Non toxic, no hazard labels
 - Less landfill



Silicone Coatings - Key Take Aways

- Silicone Coating is extremely weather resistant

Silicone is exceptionally **UV-stable**, by nature.

It remains **elastomeric**.

Ponding water resistant.

- Silicone Coating is easy to apply

Silicone is immediately **rain ready** after application.

Can be applied when it **freezes**.

One component, no mixing, no heating.

One coat application.

History

- Since 1960's used on Spray Foam Polyurethane in the USA
>50 years experience
- 1965 first silicone roof coated NY World Fair
Many landmark buildings covered
- 1991 project Parma Exhibition Center, Italy (Fiere di Parma)
- Since 2000's new generation coatings: high solids, very low VOC,
one component silicone
- New generation recently made available in Europe

Silicone Roof Coating Applications

1. For Renovation of Bitumen, PVC, TPO, coated, metal, concrete, etc.
 - Prevent expensive roof tear up
 - Prevent open time of the roof



2. After PU Spray Foam Application
Combines insulation with long term protection of the roof

PU Spray Foam with Silicone Coating



PU Spray Foam with Silicone Coating (cont'd)



PU Spray Foam with Silicone Coating - Renovation



Renovation Procedure

1. Inspection

- Construction
- Leakage, water damage

2. Cleaning

Pressure washing with water

3. Repair

Leaks, Cracks

4. Coating

Detail work & Large surfaces

5. Final Inspection & Sign off

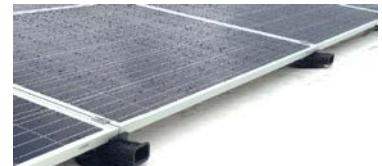
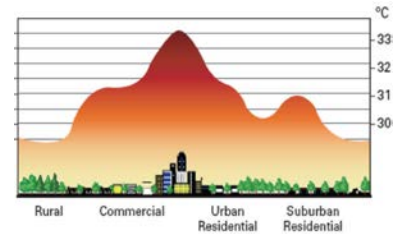


Humid areas are cooler



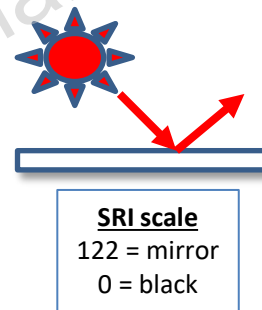
Cool Roofing

1. Lower Energy Consumption,
Higher worker productivity, Quality of life
Airco energy saving
2. Reduce Heat Islands
 - Air temp. in cities up to 3°C warmer than its surroundings...
 - Governmental regulations: commercial roofs to be cool roofs.
3. Extend roof life by reducing 'thermal shock'
Reduce stress of large temperature changes
4. Higher Solar Cell Efficiency



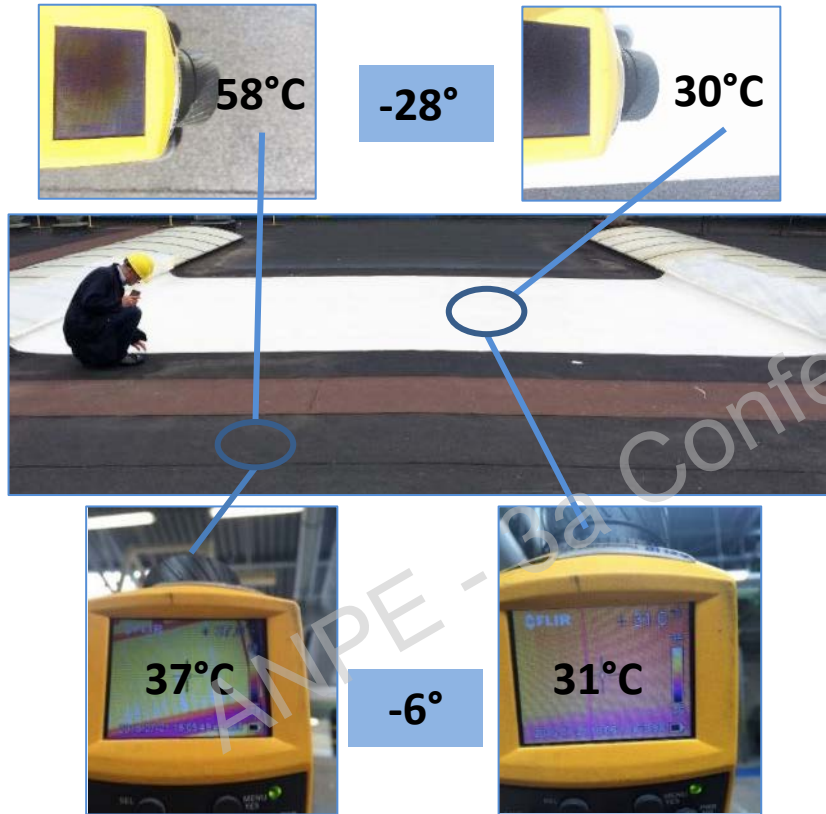
Cool Roofing with Silicone Coating

- High Reflection → Lower roof temperature
 - Solar Reflectance Index
 - SRI(initial) = 111 (white silicone coating, initial value)
 - SRI(aged 3years) = 103 (aged 3 years)
 - Solar Reflectance
 - SR(initial) = 88%
 - SR(aged 3years) = 86%



- Energy saving for buildings
- Mediterranean area = ~ **5% lower energy cost**
 - Middle East = ~ **17% lower energy cost**

Cool Roofing with Silicone Coating



Typical Industrial Roof

- 19 year old Granulated Bitumen Membrane
- Steel deck, vapour barrier, 5 cm wool insulation, liquid oxidized bitumen
- White silicone coating (730 micron, 1 kg/m²)
- Measured on a 29°C day

Result

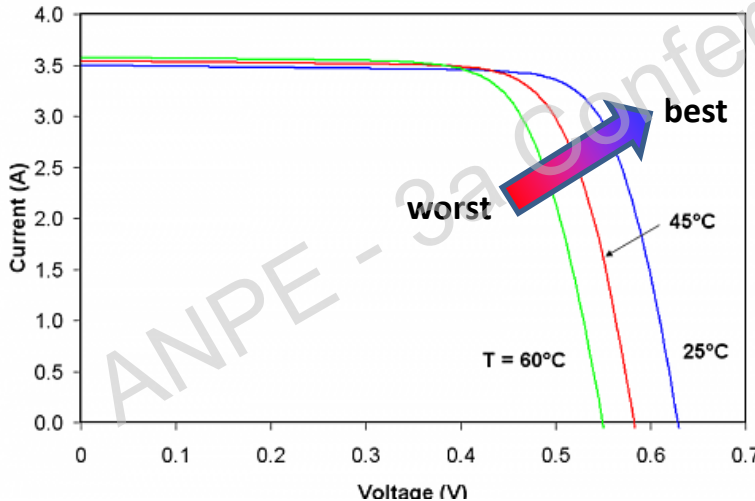
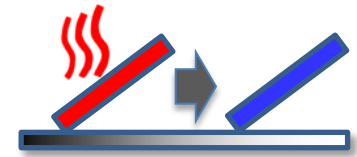
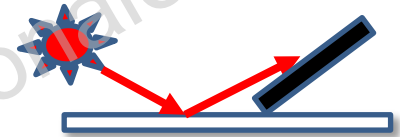
- 28° lower surface temperature
- 6° cooler inside the building

Cool Roofing with Silicone Coating (cont'd)

- Higher Solar Cell efficiency with cool roof coating

1. More reflection onto the panel → higher yield
2. Lower Solar Cell temperature → higher Voltage → higher Power 0.5%/°C

Example: temperature from 65°C to 25°C = +20% electrical power



“Solar panel yield increases by 3-5% on a cool roof”

Conclusion

- 100% Neutral Silicone Coatings
 - UV-stable → Low TCO
 - Easy & Safe to apply
 - Saves Energy
 - Better Quality of Life
 - Increased Solar Cell Yield
 - New in Europe

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Questions?

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Antitrust Policy Statement

- It is and shall remain the policy of the Conference Organization, and it is the continuing responsibility of every participant to comply in all respects with antitrust laws.
- No activity may be engaged in for the purpose of bringing about any understanding or agreement to (1) raise, lower or stabilize prices; (2) regulate production; (3) allocate markets; (4) encourage boycotts; (5) foster unfair or deceptive trade practices; (6) assist in monopolization; or (7) in any way violate or give the appearance of violating antitrust laws.
- Any concerns or questions regarding the meaning or applicability of this policy, as well as any concerns regarding activities should be promptly brought to the attention of the Conference Organization's legal counsel.



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Performance Coatings

Appendix

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100% Neutral Alkoxy Silicone Coating

- No solvent, oil dilution
- No water emulsion
- No Hybrid / STP (Silane Terminated Polymer)
- Alkoxy vs Oxime
- 1 component, not 2
- 1 coat, not 2 or 3
- No primer needed, adheres to all normal roof surfaces:
 - PU foam
 - PU coating
 - Acrylic coating
 - Bitumen APP or SBS-membrane, granulated or smooth
 - PVC membrane
 - TPO membrane
 - Concrete (>30 days old)