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**NKUA**

# Cool Roof Rating Programme

# Introduction

- What is the ECRC roof product rating program?
- What properties are reported
- How is the credibility of the reported values guaranteed?
- What is the process for rating a product?
- Conclusions

# ECRC Product rating program overview

- A uniform and credible system for rating and reporting the radiative properties of roofing materials.
- Roofing product manufacturers & sellers will label various roof products with radiative property values
- Code bodies, architects, building owners, specifiers etc. can have credible radiative properties data
- The radiative properties that will be reported are the solar reflectance (SR) and the infrared emittance (e) and calculated SRI
- Radiative properties are determined and verified through testing by ECRC approved test laboratories and a process of random testing of rated products
- The ECRC product rating program does not specify minimum or target values for any radiative property

# Measurement of reflectance



Spectrophotometer with an integrating sphere



Solar Spectrum Reflectometer (ASTM C1549)

1. ASTM E903 in conjunction with G173-03 (2012).
2. ASTM C1549.
3. CRRC-1 Test Method #1

- Variegated Roofing Products: CRRC-1 Test Method #1.
- Tile Products : CRRC-1 Test Method 1 or the Template method

# Measurement of emittance



D&S Emissometer (ASTM C1371 (2010))



Inglas TIR-100 Emissometer (EN 15976 (2011) )

1. ASTM C1371
2. EN 15976

➤ Low conductivity materials: Any product not on an uninsulated metal substrate shall be tested using the Slide Method.

➤ Profiled products: Measurement of products having cylindrical surfaces products shall be done according to the method described in the Devices & Services Technical Note TN 11-2

# Solar Reflectance Index

## SRI:

Radiative properties (solar reflectance and thermal emittance) and convective cooling effects are combined into one scheme.

**ASTME1980 – 01**

$$\text{SRI} = 123.97 - 141.35x + 9.655x^2$$

**Where :**

$$x = ((a - 0.029e) \cdot (8.797 + hc)) / (9.5205e + hc)$$

$a$  = Solar absorbance (1 - TSR )

$e$  = Thermal emittance

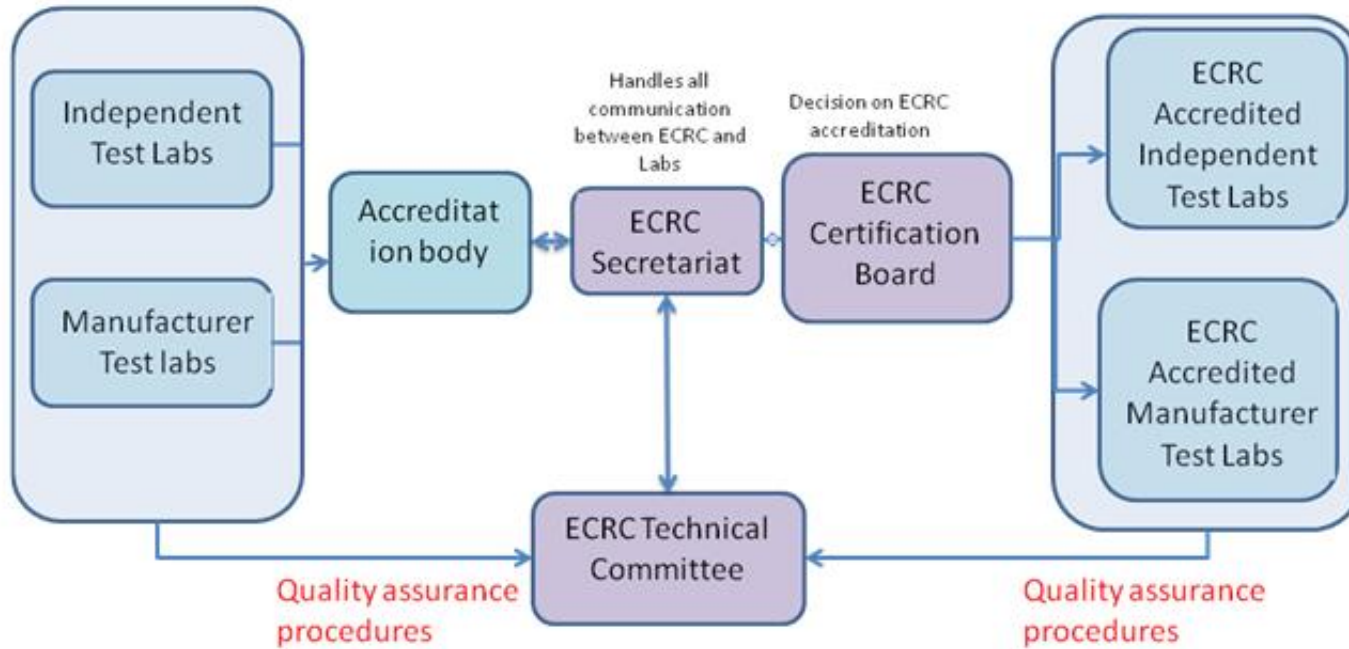
$hc$  = Convective coefficient ,  $\text{W}\cdot\text{m}^{-2}\cdot\text{K}^{-1}$

5 = low convectational coefficient

12 = medium convectational coefficient

30 = high convectational coefficient

# Lab accreditation process



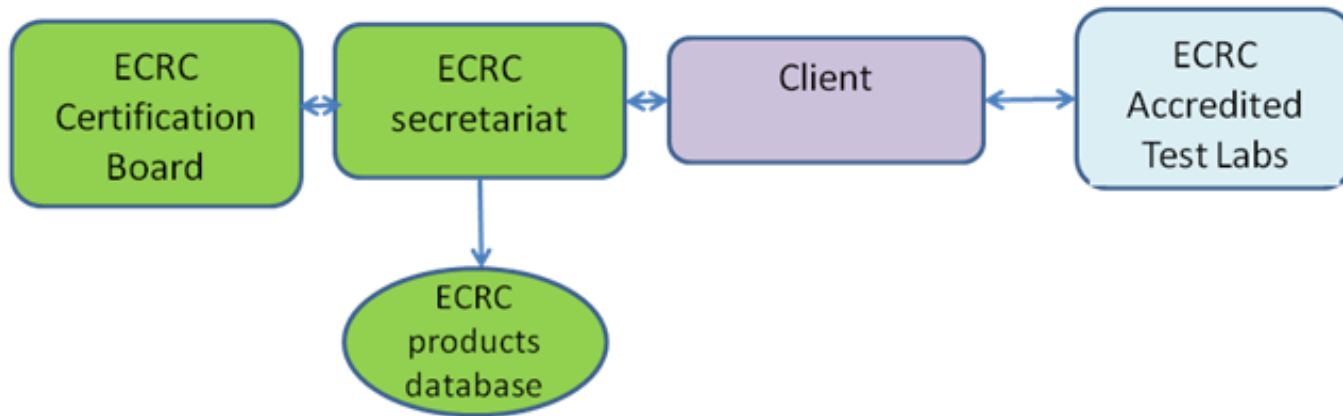
- Independent or manufacturer test labs must be ISO 17025 accredited for ECRC approved measurement methods
- QA procedures: Random testing of rated products + ILC for labs

## Initial rating process





# Initial rating process




1. Obtain a unique company and product identification
2. Submit samples to be tested
3. Applying to have product ECRC accredited
4. Upon acceptance products will be included in the Rated Product Database and the ECRC rated product label will be distributed

# ECRC Products database

- ECRC rated product ID
- Product Brand
- Product Type
- Initial & aged values for Solar Reflectance,
- Initial & aged values for Infrared Emittance
- Initial & aged values for Solar Reflectance Index
- State the climate type where the weathering test has been conducted,
- The product 's intended roof slope (low and/or steep slope)
- The colour that best describes the product
- More information on the product (e.g. company website, contact person, test methods used)

Rated Products will remain in the database for 3 years

# ECRC Product label

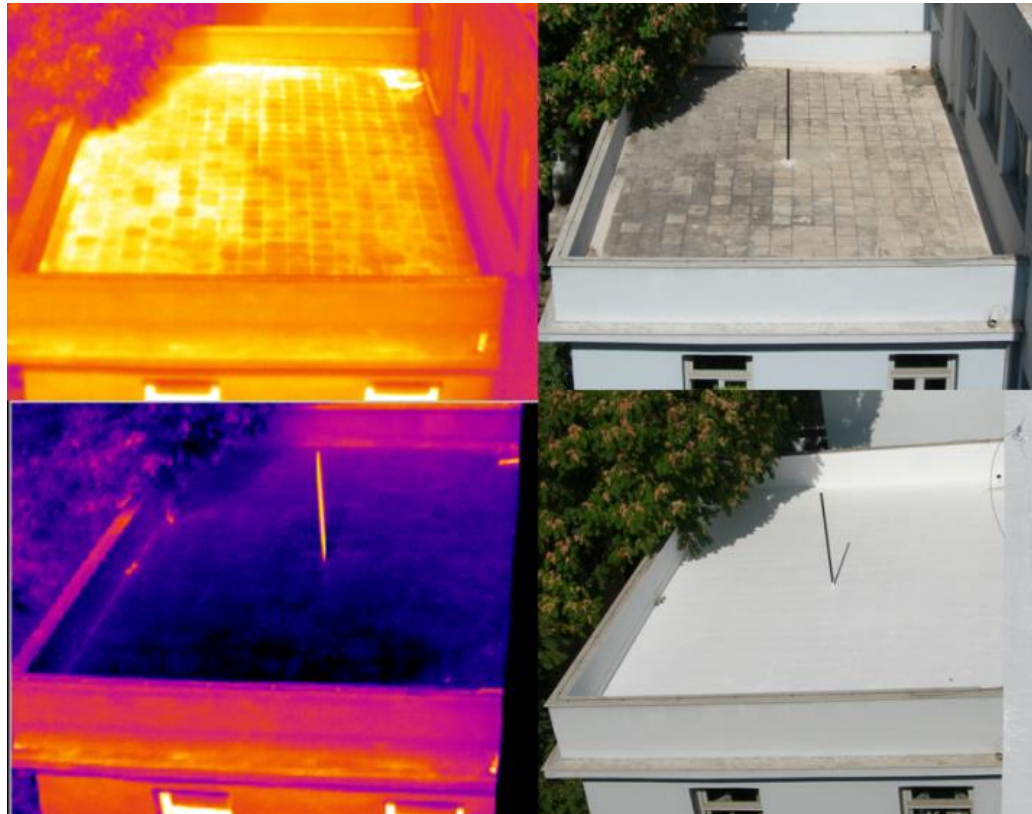
			Rated Product ID Number _____	
RATED PRODUCT			Initial	Aged
Solar Reflectance			0,00	Pending
Infrared Emittance			0,00	Pending
Solar Reflectance Index			0	Pending
Climate type			Date of measurement	Manufacturers name
Mild			17/11/2013	Abolin
<p>European Cool Roofs Council Ratings are determined for a fixed set of conditions which may not be appropriate for determining differing seasonal performance. The actual effect of solar reflectance and thermal emittance on building performance may vary with differing conditions. The manufacturer of this product stipulates that these ratings were determined in accordance with the applicable European Cool Roofs Council procedures.</p>				

# ECRC Product rating manual

Initial Product Rating Manual  
Technical Committee  
V3\_January 2014

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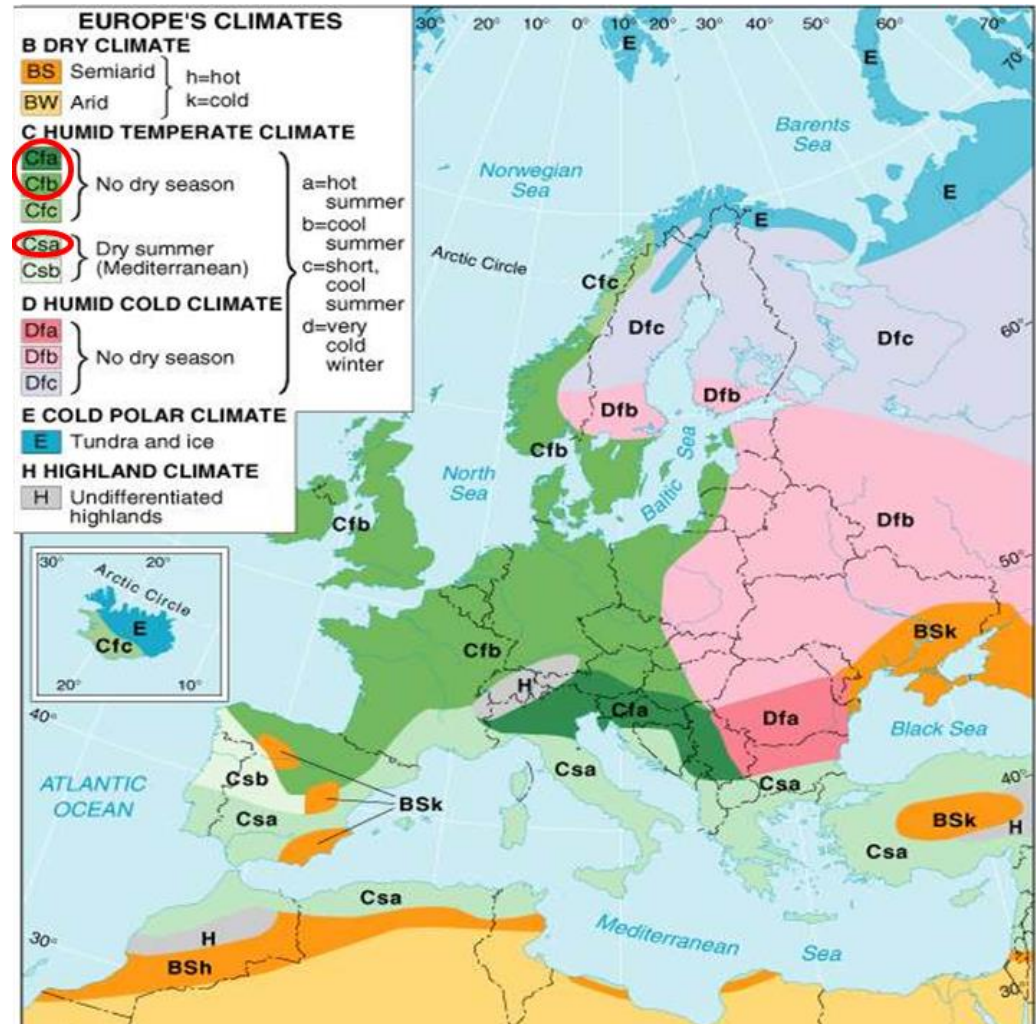
# Ageing of cool materials



- Aging and weathering affects the performance of cool materials

# Weathering tests

- Weathering testing process under development
- Weathering tests in 3 different climatic regions representing the anticipated cool roof market in Europe
- The ECRC will start negotiations with the existing site that fulfils its requirements and encourage the creation of new WTSs



# Conclusions

- Cool roofs contribute to mitigating climate change, reduce the urban heat island effect & increase the sustainability of buildings
- The cool roof concept and products are on the move both internationally but also in Europe as they present part of the solution for EU energy & environment policy challenges
- The results of the case studies indicate a decrease in indoor temperature of 1.5-2°C and a decrease in cooling energy loads in the range of 10-40%
- Applying cool roof technology buildings in Mediterranean and moderate climatic conditions in Europe can be beneficial in terms of increased thermal comfort in the summer and can decrease overall energy use for heating and cooling. Energy savings depend on building related construction and operation characteristics.

## Conclusions

- The ECRC product rating program will provide a uniform and credible system for rating and reporting the radiative properties of roofing materials
- The ECRC has given an important boost in the European cool roof market and plans to engage with policy/decision makers as well as major stakeholders in order to increase cool roof awareness, promote the benefits and facilitate incentivising of CR