



# Increasing Resilience in the Built Environment with Cool Roofs and Walls

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Cool Roof Rating Council

# Cool Roof Rating Council

## Mission

To bring objective, scientific information related to cool surfaces to critical discussions and informed decisions about the impacts of heat islands, extreme heat, and energy use in the built environment.

*The CRRC **does not** advocate for specific requirements*



# Building Envelope Solutions for Heat Mitigation

March 19, 2024

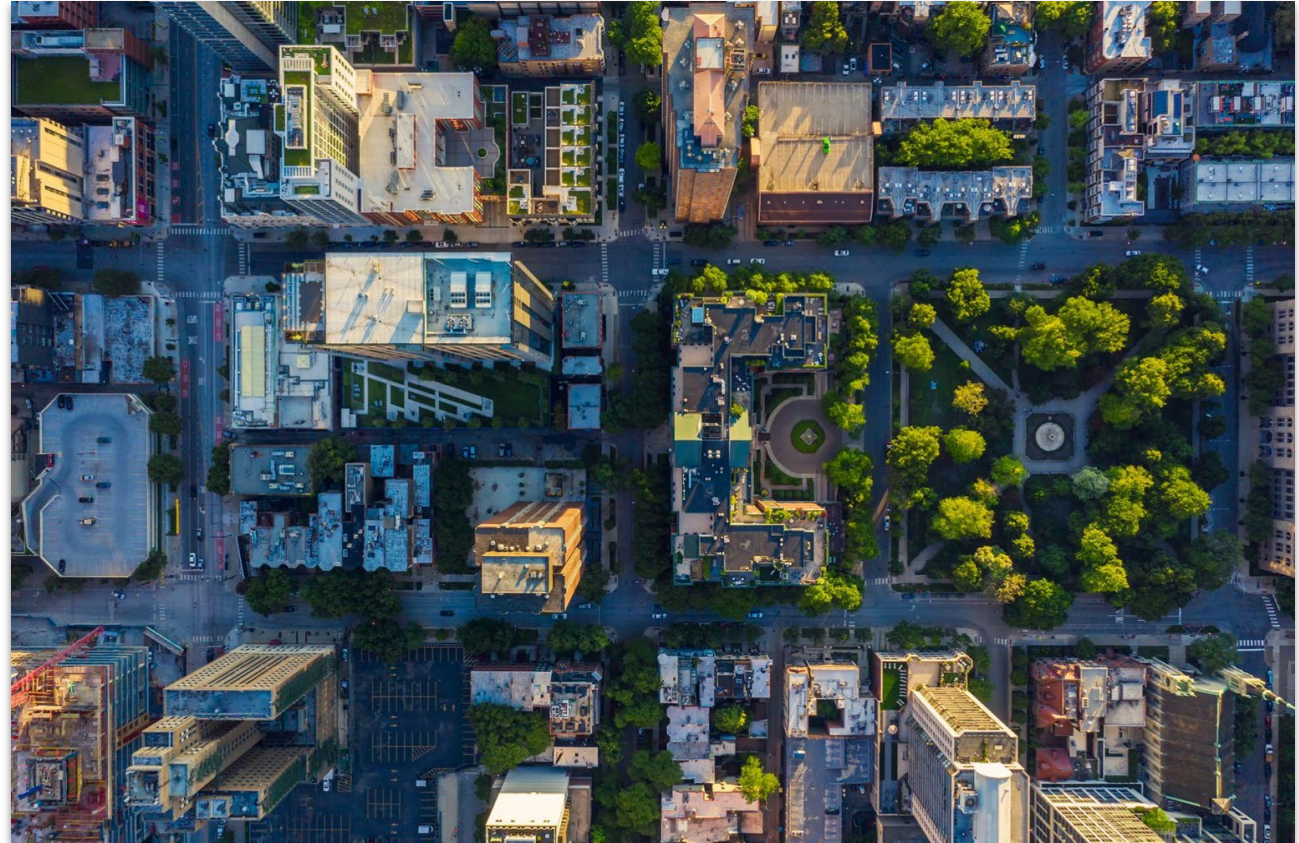


Image Source: iStock



# Cities are typically hotter than surrounding suburban and rural areas

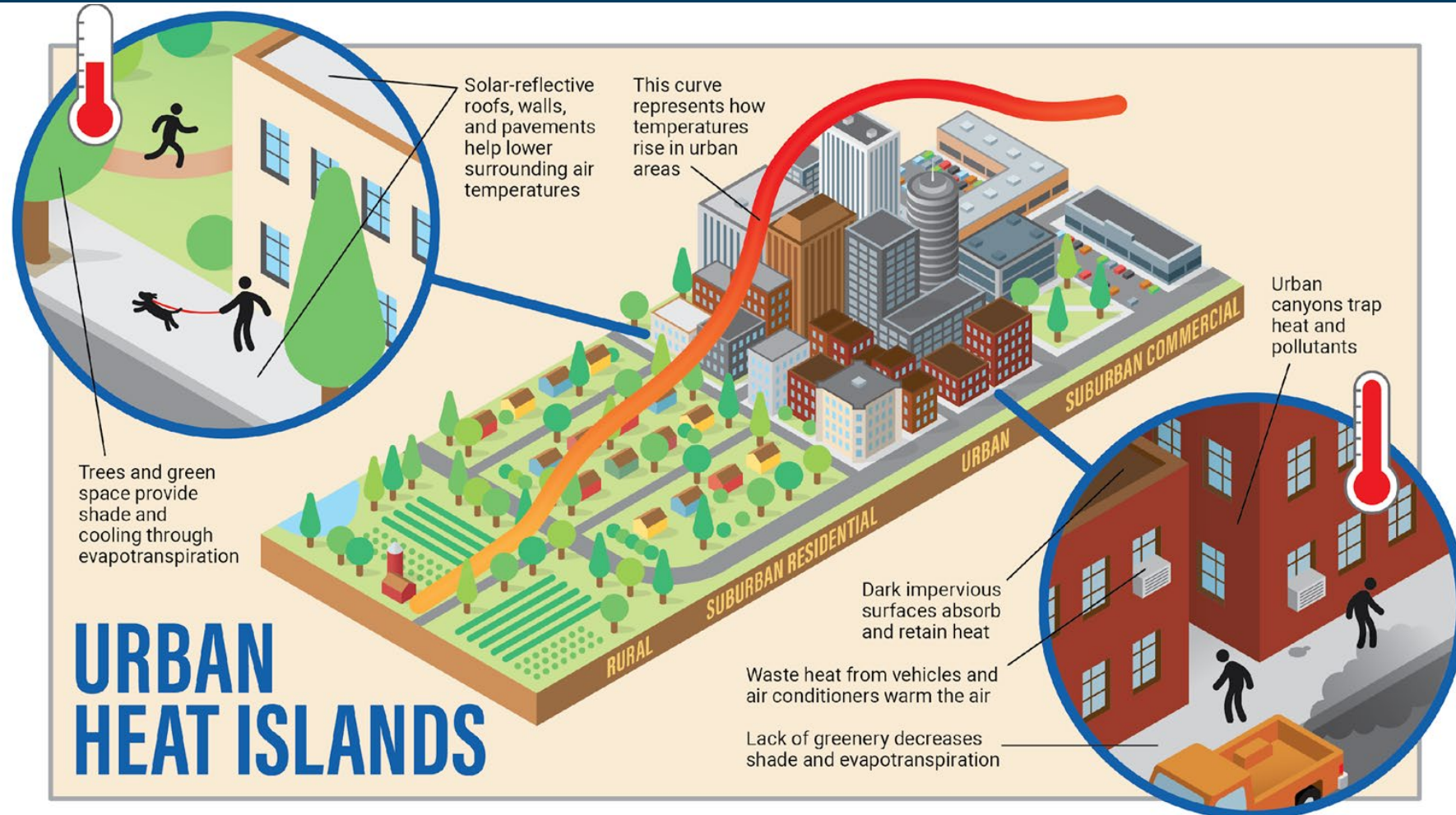
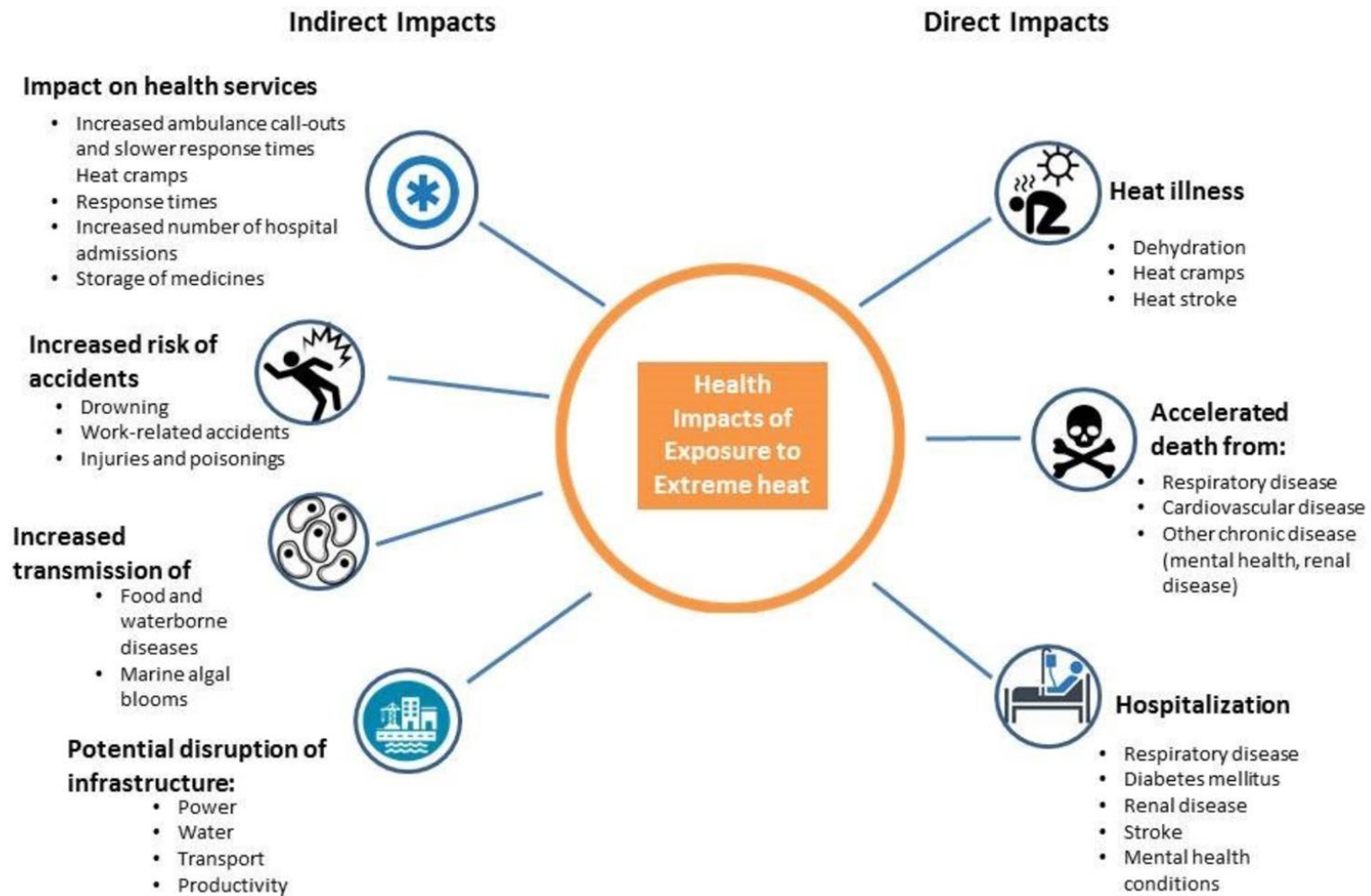


Image Source: Cool Roof Rating Council

# Heat is the leading weather-related cause of human mortality in the U.S.





# Heat also impacts energy use and air quality



# A/C use creates a positive feedback loop

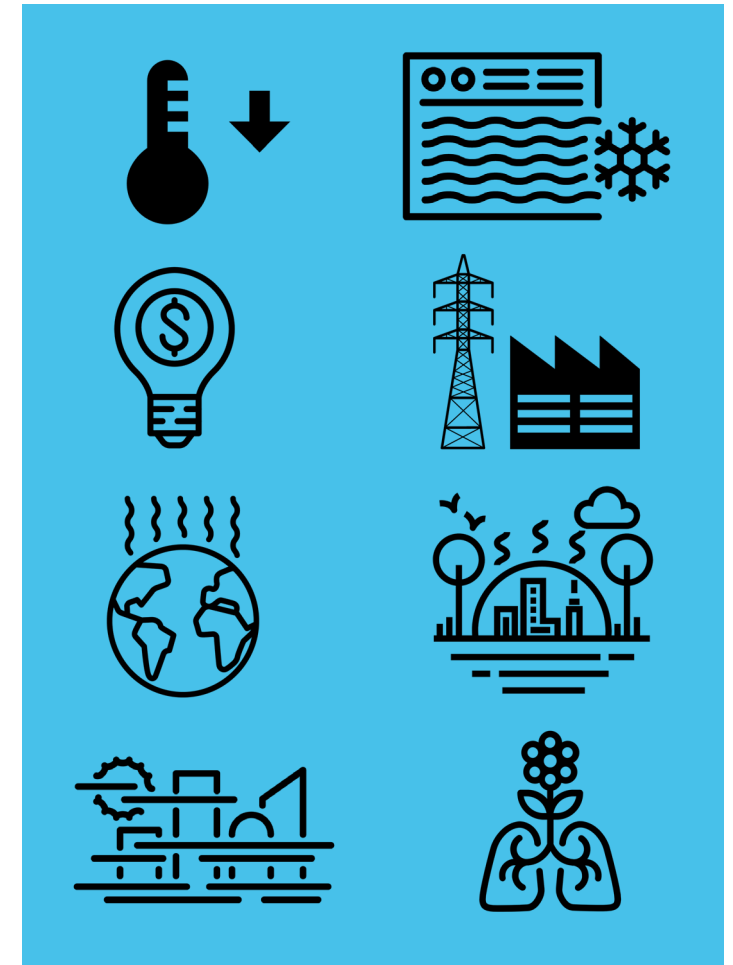




# Cool roofs and walls reduce surface temperatures and product multiscale benefits

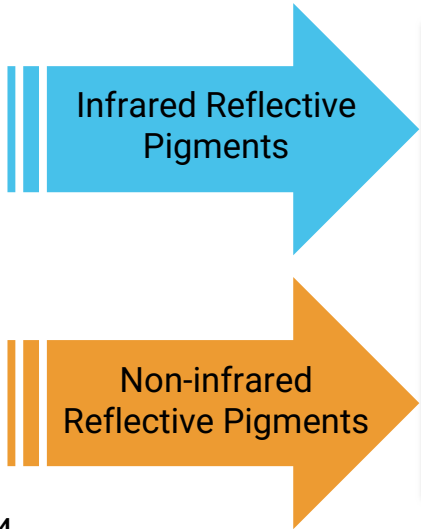


Image Source: Cool Roof Rating Council





# Cool products come in many materials, shapes, and colors



R=0.41	R=0.44	R=0.44	R=0.48	R=0.46	R=0.41
<i>black</i>	<i>blue</i>	<i>gray</i>	<i>terracotta</i>	<i>green</i>	<i>chocolate</i>
R=0.04	R=0.18	R=0.21	R=0.33	R=0.17	R=0.12

Image Source:: American Rooftile Coatings

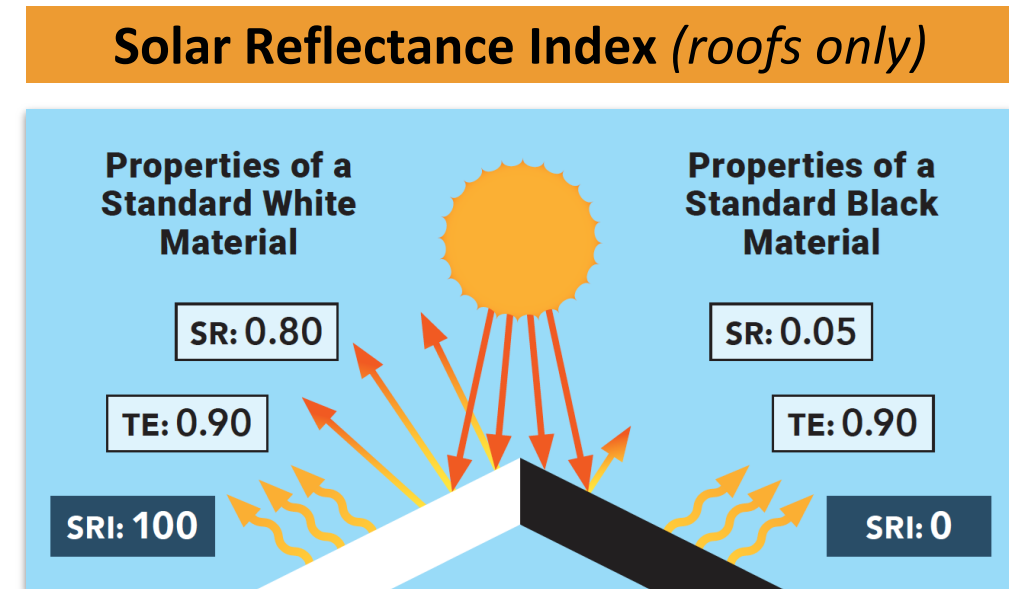
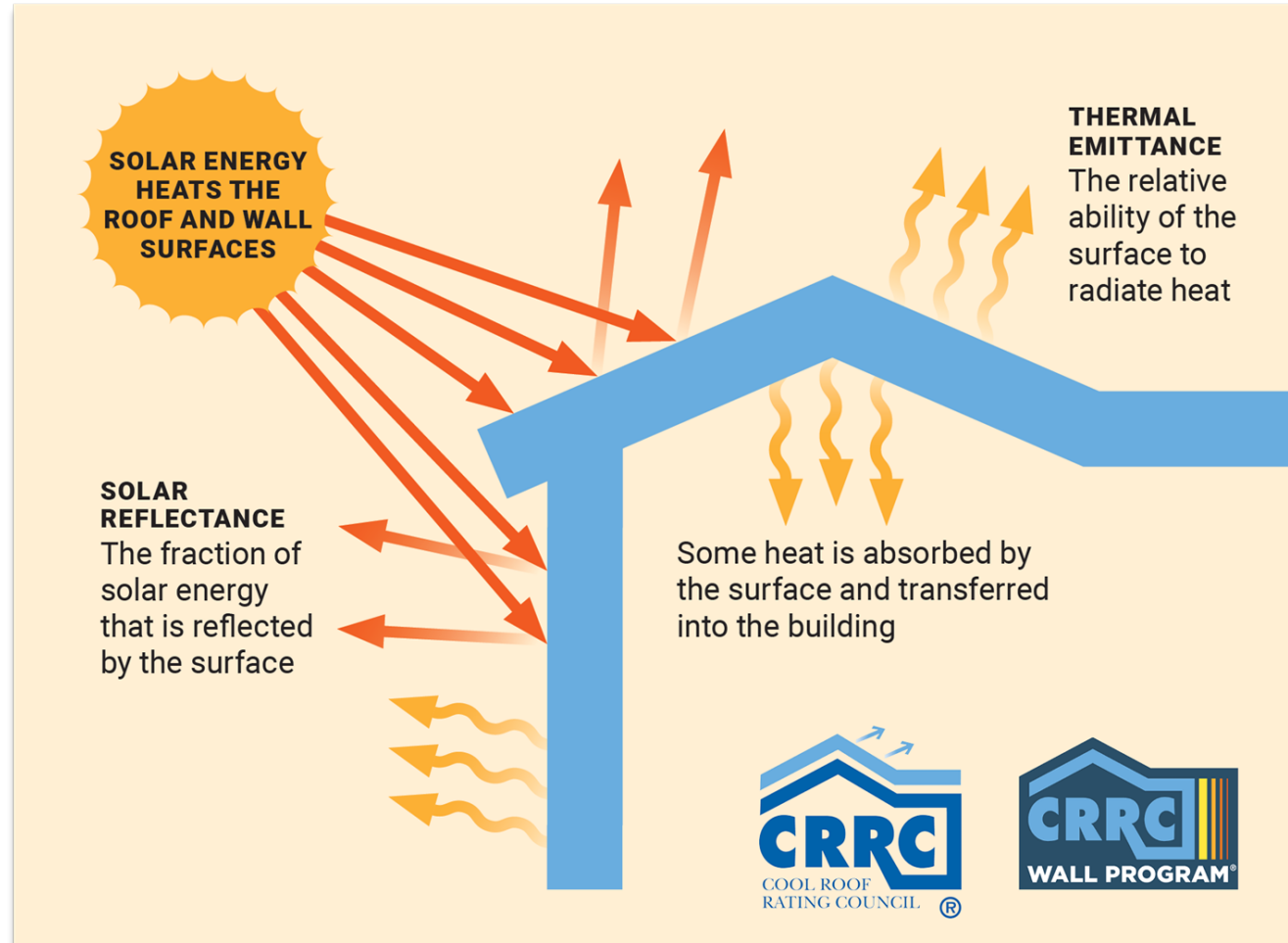
# Product Testing, Rating, and Labeling



Image Source: iStock



# Surface Radiative Properties



# Radiative Property Testing

- Solar Reflectance Standards
  - ASTM C1549
  - ASTM E903
  - ASTM E1918
  - 410-Solar Test Method\*
- Thermal Emittance Standards
  - ASTM C1371
  - Slide Method\*

*\*Not an ASTM Method*

D&S Solar Spectrum Reflectometer



Image Source: Devices and Services

D&S AE1 Emissometer

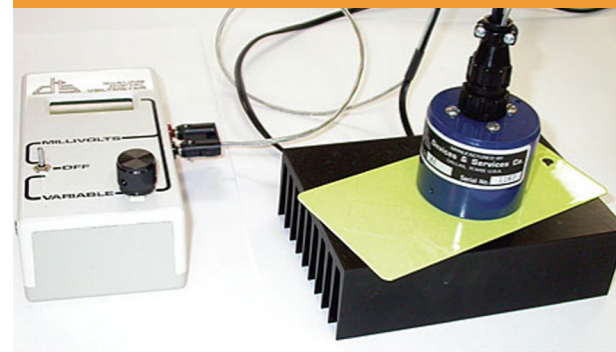


Image Source: Devices and Services

SOC 410-Solar Reflectometer



Image Source: Surface Optics Corporation



# Natural weathering is crucial for understanding radiative performance over time

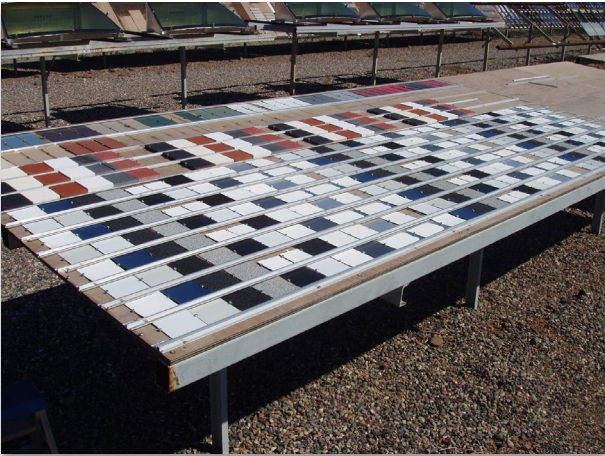


Image Source: Atlas Weathering Services



Image Source: Lawrence Berkeley National Laboratory

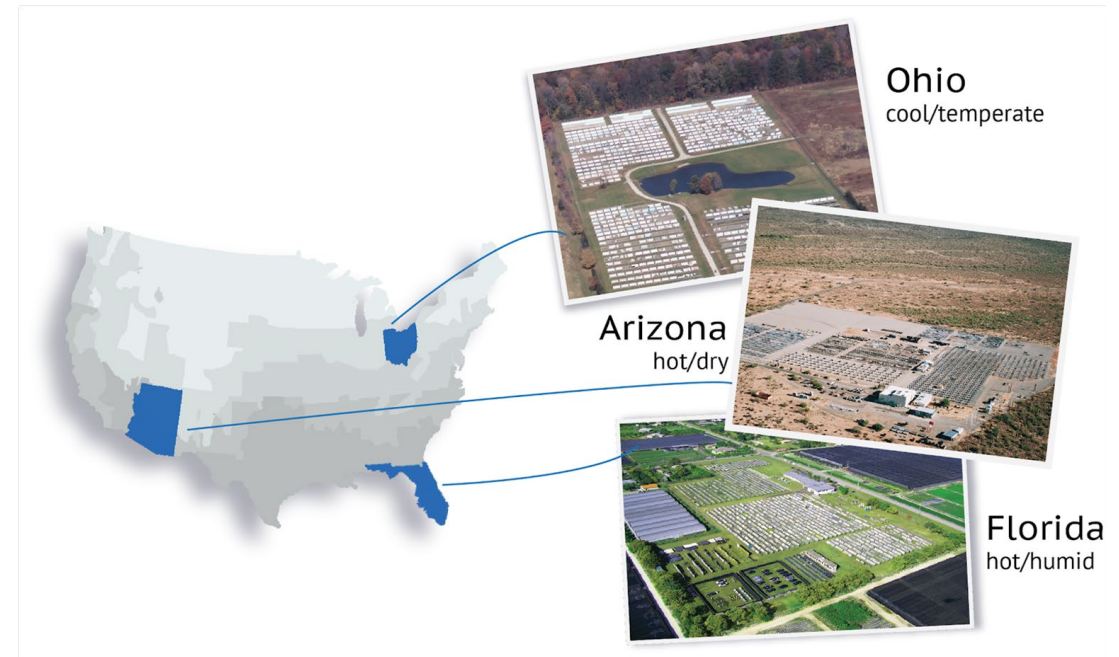


Image Source: Atlas Weathering Services

# Laboratory Aging for Roof Products

- Based on ASTM D7897
- Roof products only

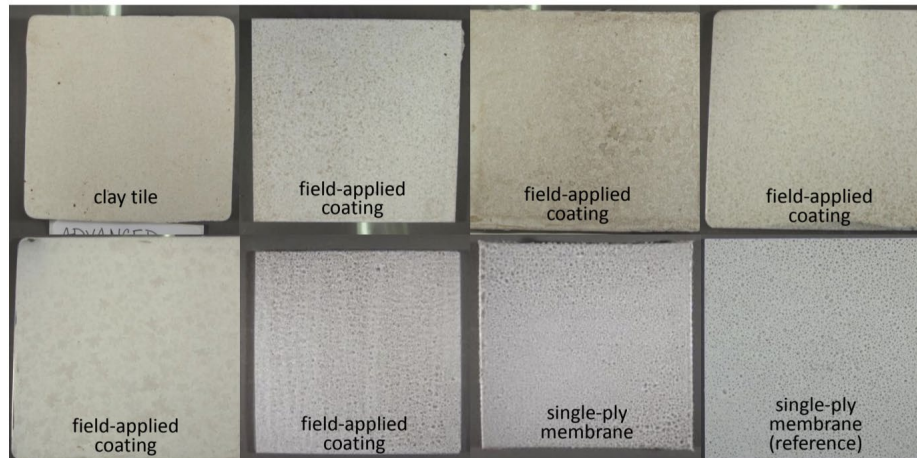
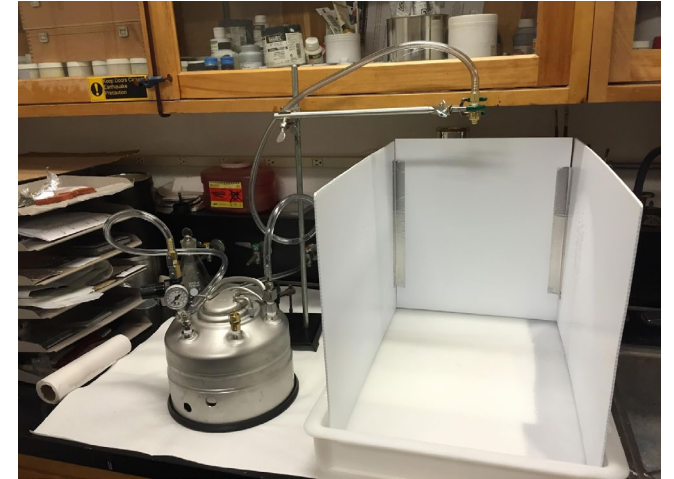


Image Source: Heat Island Group, Lawrence Berkeley National Laboratory



# Ratings are published online

**CRRC Rated Roof Products** Walls Directory Support 1

Search keywords

3192 results

Sort by ↓

Product Type	Colors	Solar Reflectance	Thermal Emittance	SRI	CRRC PROD ID.	MANUFACTURER	BRAND AND MODEL	PRODUCT TYPE	COLOR	SOLAR REFLECTANCE INITIAL 3 YEAR	THERMAL EMITTANCE INITIAL 3 YEAR	SRI INITIAL 3 YEAR
					0287-0001	IRC Topper	IRC Topper Asphalt Shingle	Asphalt Shingle	Multicolor	0.30 0.29	0.88 0.87	31 29
					0287-0010a	IRC Topper	IRC Topper Metal Shingle	Metal	Red	0.35 0.35	0.83 0.83	36 36
					0103-4154	Iron Roofing	Iron Roofing Polymer 1 Tile Iron Roofing Polymer 2 Iron Roofing Polymer 3		Tan	0.30 0.30*	0.92 0.92*	33 33
<div><div>Manufacturer: All</div><div>Slope: All</div><div>Product Market: All Markets</div></div> <div><div>CRRC PRODUCT ID 0452-9025 (smooth)</div><div>MANUFACTURER Magic Coating Company Inc.</div><div>BRAND Alpha 8</div><div>MODEL 505</div></div> <div><div>TYPE Coating</div><div>MANUFACTURER Bright White</div><div>PRODUCT MARKET All Markets</div><div>SLOPE Low</div></div> <div><div>APPLICATION APPROVAL DATE August 15, 2018</div><div>MANUFACTURER CONTACT Sharon Randolph 619-555-3300 www.magiccoating.com</div></div>												
					0224-0546 (smooth)	Trident Roofing	Trident Weather Shell TOP	Coating	Bright White	0.80 0.74	0.92 0.91*	100 92
					0224-0002 (smooth)	Trident Roofing	Trident Topper Supreme	Coating	Bright White	0.80 0.68	0.88 0.89	100 83

## RESULTS ARE DISPLAYED IN A SORTABLE TABLE:

1 Use the  button to sort and reorder products


2 A letter after the CRRC Product ID means the product is a reformulation of a previously rated product


3 Indicates if the product is sold to other roofing manufacturers, end-use customers, or both

4 Indicates if the coating was tested over a smooth or rough substrate, as defined in the CRRC-1 Product Rating Program Manual

5 An asterisk indicates the product obtained a Rapid Rating, which will be replaced by three-year aged values once the weathering period is complete

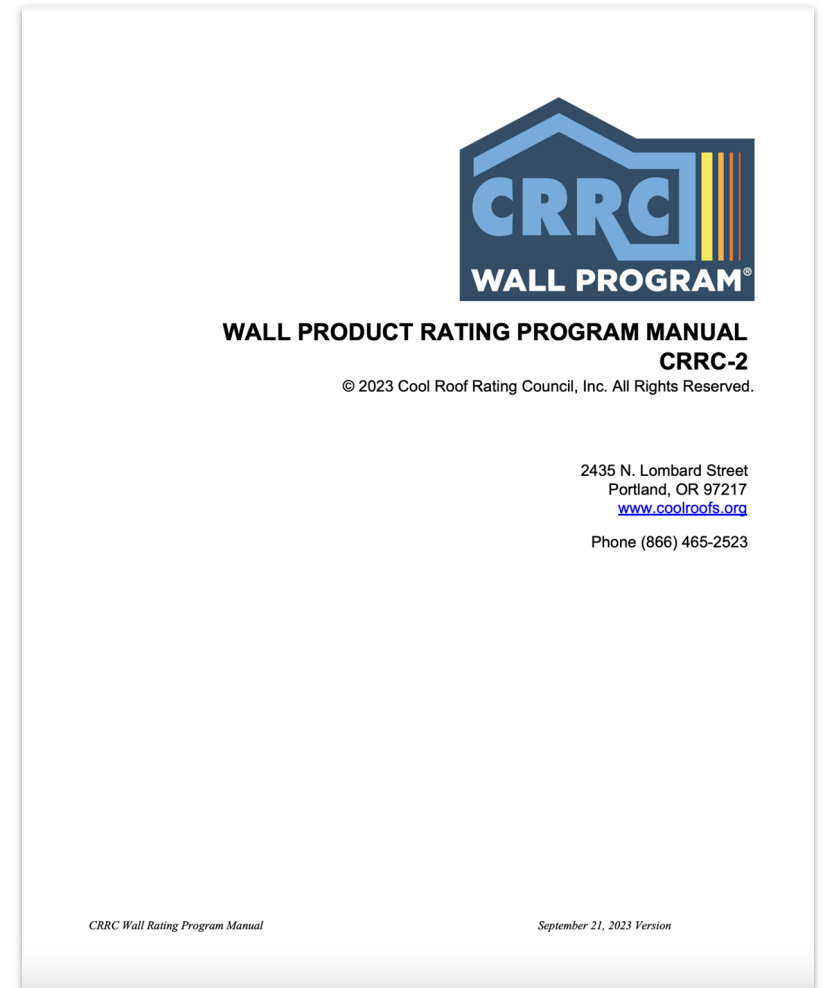
# Rated product labeling

	<b>Rated Product ID #: 0000-0000</b>		
		<b>Initial</b>	<b>Aged</b>
	<b>Solar Reflectance</b>	<b>0.00</b>	<b>0.00</b>
	<b>Thermal Emittance</b>	<b>0.00</b>	<b>0.00</b>
The ratings above are subject to CRRC rating program conditions, requirements, and limitations. Visit <a href="https://coolroofs.org">coolroofs.org</a> for important information and disclaimers about CRRC rating conditions, requirements, and limitations.			

	<b>Wall Rated Product ID #: W000-0000</b>		
		<b>Initial</b>	<b>Aged</b>
	<b>Solar Reflectance</b>	<b>0.00</b>	<b>Pending</b>
	<b>Thermal Emittance</b>	<b>0.00</b>	<b>Pending</b>
The ratings above are subject to CRRC rating program conditions, requirements, and limitations. Visit <a href="https://coolroofs.org">coolroofs.org</a> for important information and disclaimers about CRRC rating conditions, requirements, and limitations.			

# Wall Product Rating Program

- Launched January 2022
- First rating program of its kind in the world
- Entirely separate from CRRC Roof Program
- Diverse set of stakeholders developed programmatic and technical requirements
- Currently proposing to include walls in ANSI/CRRC S100 standard





# Important role of third-party ratings



Image Source: iStock

- Informs consumers about product's ability to reduce heat gain
- Helps consumers ID higher performing/compliant products
- Gives assurance of unbiased and verified data
  - Provides validity to marketing claims
  - Supports programs and policies

# Cool Surface Adoption in the United States



Image Source: Pixabay

## A 'Cool Roof' Can Help You Beat The Heat — And Save Money

By [Erin Stone](#)

Published Aug 17, 2023 5:00 AM



## How Cities Are Adapting to Climate Change



By: [Linnea Harris](#)

Published: August 15, 2023

Edited by [Chris McDermott](#)



# The Washington Post

*Democracy Dies in Darkness*

**Opinion** | Extreme heat is punishing the country. Here's how to prepare for more.



By the Editorial Board

[+ Follow](#)

August 22, 2023 at 5:45 p.m. EDT

“Reflective building materials, such as cool roofs, which reflect sunlight and can reduce peak daytime temperatures, should be integrated into new buildings and retrofitted on old ones” - *WP Editorial Board*

## Forbes

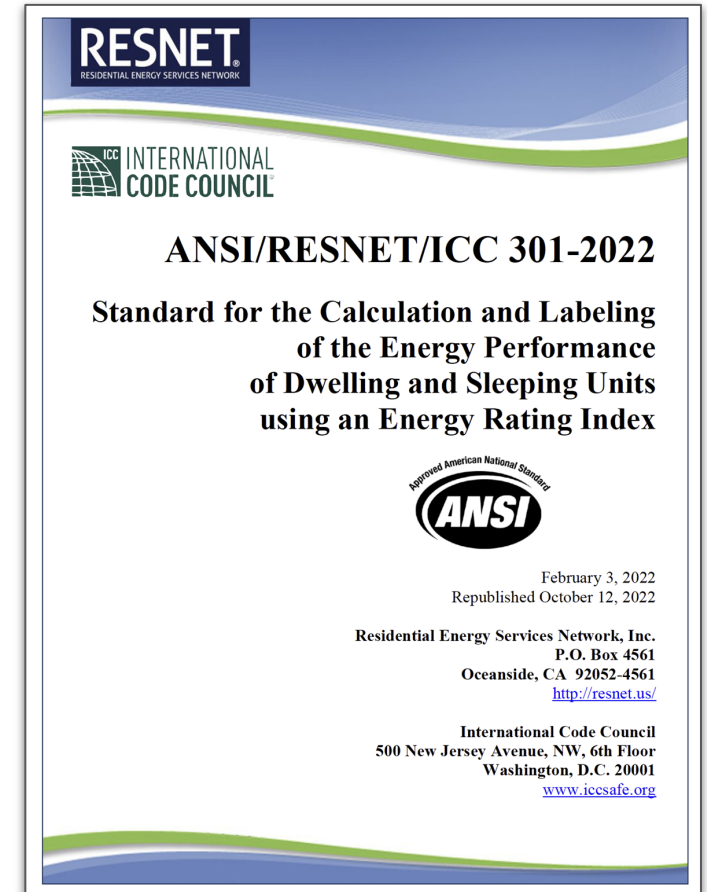
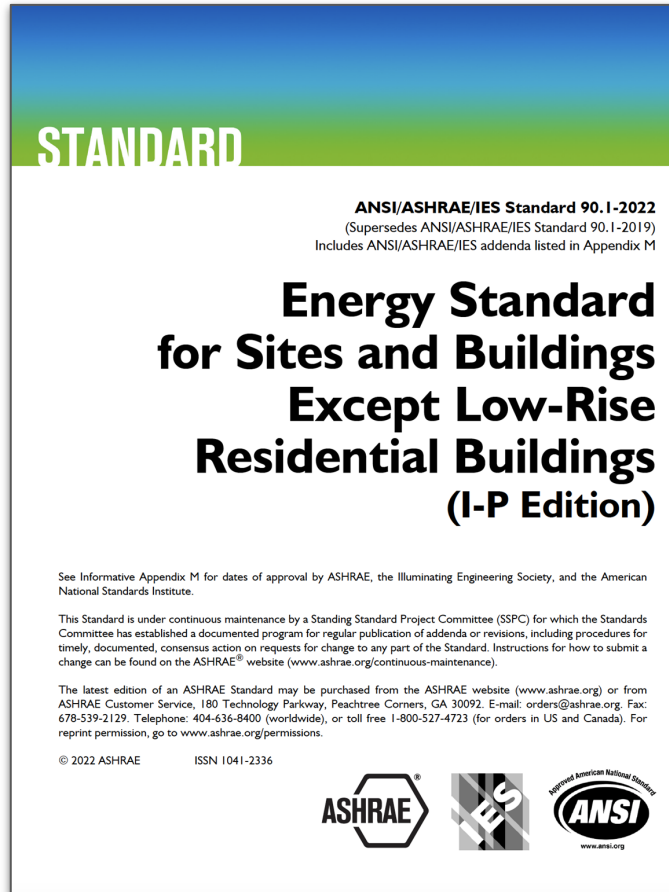
FORBES > REAL ESTATE

## Protecting Your Home From Extreme Heat Damage

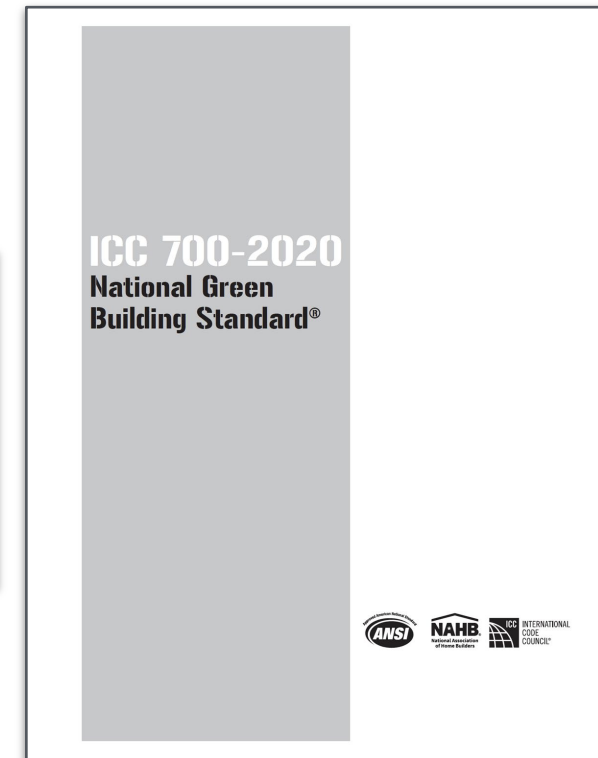
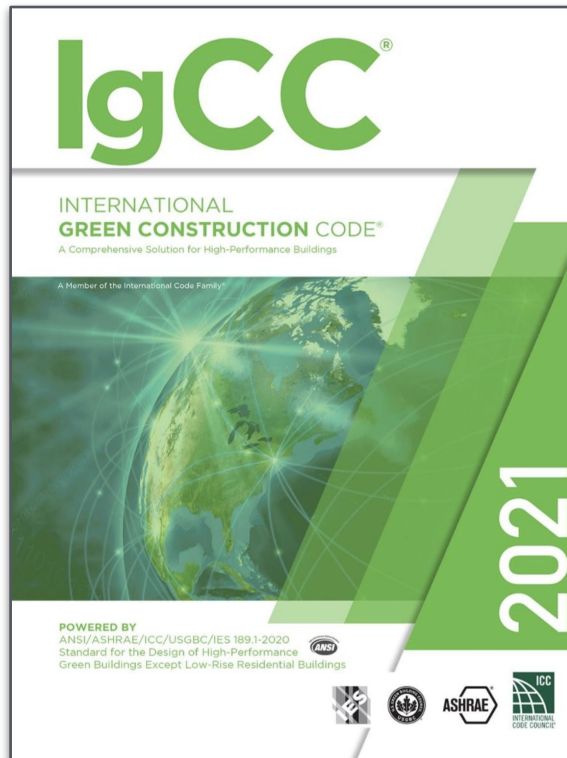
“You may not have heard the term ‘cool roof’ or ‘cool walls,’ but both are designed to reflect sunlight and absorb less heat, reducing the ambient temperature of indoor and outdoor spaces” - *Forbes*



# Model Energy Codes and Standards



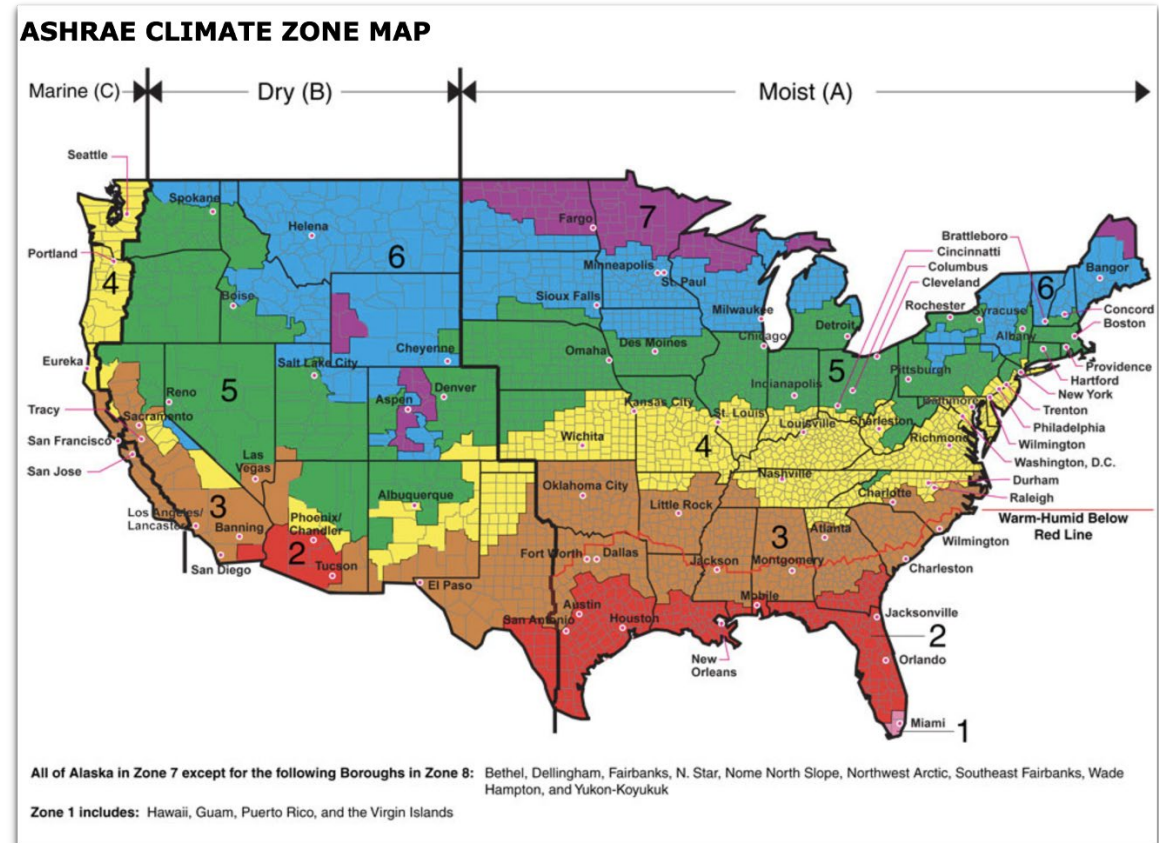
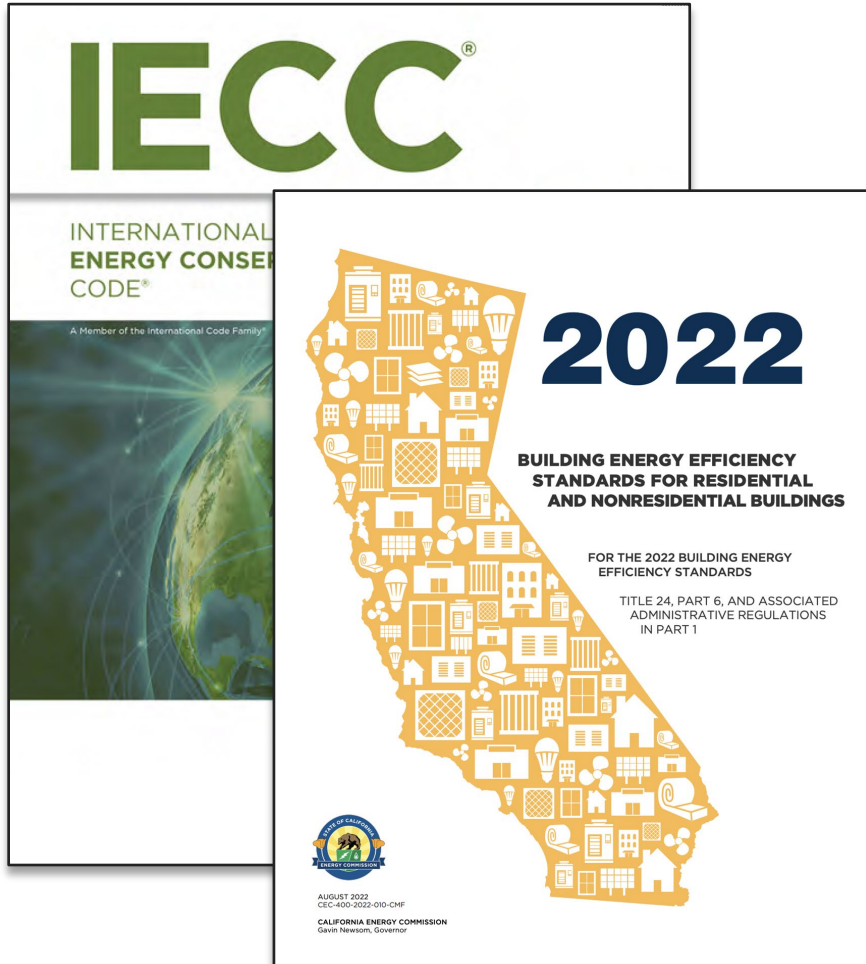
# Green Building Standards and Programs



For more programs, visit: <https://coolroofs.org/resources/codes-programs-standards>



# Municipal and State Codes



For more codes, visit: <https://coolroofs.org/resources/codes-programs-standards>

# Federal Resources

## •Funding

Inflation Reduction Act (IRA)

Bipartisan Infrastructure Law (BIL)

FEMA's Hazard Mitigation Assistance (HMA) grant programs

U.S. Department of Housing and Urban Development (HUD)

## •Guides

[HUD Climate Resilience Implementation Guide](#)

[DOE Building America Solutions Center](#)

[FEMA HMA Fact Sheet](#)



Image Source: iStock



# Challenges to Wide-Scale Deployment

**Awareness  
&  
Education  
(Demand)**

**Product  
Availability  
(Markets)**

**Financial  
Incentives  
(Cost)**

**Potential  
unintended  
impacts  
(Design)**

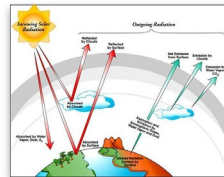
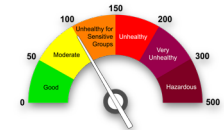
# U.S. Cool Surfaces Deployment Project

## Challenge

Uptake of cool surfaces has been strong in California and Florida, but limited nationally

## Goal

Dramatically increase the climate-appropriate deployment of cool roofs and walls across the U.S., with emphasis on their application to disadvantaged communities



DOE-funded U.S. Cool Surfaces Deployment Project aims to make our aging buildings cooler and more heat resilient with reflective roofs and walls

# U.S. Cool Surfaces Deployment Project

## 19 transformative ideas include

- “Keep Your Cool” education campaign
- High-profile cool roof/wall demonstrations in disadvantaged communities
- Technical assistance to governments

## Seeking participants

- Read the [deployment plan](#)
- Join the education team
- Join the demonstration team
- Sign up <https://CoolSurfaces.LBL.gov>





# Contact Us

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