

Cal-THRIVES

Cool Walls



Description

A cool wall is an exterior wall surface that stays cool in the sun by reflecting sunlight. It can reduce summer overheating inside the building by decreasing solar heat gain through the wall.

A cool wall is very similar to a cool roof. Reflective walls and roofs have long been used to lower indoor temperature in hot, sunny climates.

A cool wall material can be as simple as a light-colored paint, but “cool color” technology offers a wide palette.

Keeping You Cool and Comfortable

Residents of a hot climate like Fresno, CA can expect cool walls to:

- Lower indoor air temperatures by 0.6–1.6 °F (0.3–0.9 °C) when air conditioning is not available
- Reduce by 12–41% the number of uncomfortably hot hours when air conditioning is not available
- Reduce by 4–13% the number of uncomfortably warm or hot hours when air conditioning is available

Other Benefits for You

- When applied to all exterior walls, provides annual energy cost savings per unit cool wall area of about \$0.025–0.19/ft² (\$0.27–2.08/m²) in Fresno, CA.
- No operation or maintenance needed
- Mitigates the “urban heat island” effect nearly as well as cool roofs. Can be even more effective than a cool roof for saving energy in older homes. LEED Pilot Credit is available.

SOURCES: Cal-THRIVES (Cal-THRIVES.lbl.gov), Berkeley Lab; Zhang et al. (2018)

Installation

Cool wall paints can be used and professionally applied in the same way as conventional paints, or are available for do-it-yourself (DIY) projects at home improvement stores. Cool versions of other wall surface materials, such as metal

“Cool” walls reflect sunlight to reduce overheating in your home. They also cool the outside air, mitigating the “urban heat island” effect.

cladding or vinyl siding, are also available.

Cool paints typically require the use of a light-colored primer if applied over a dark surface. Manufacturers selling cool-paint systems will provide application instructions.

Cool walls are most effective on the east and west sides of the building because these facades receive the most summer sun. Cool walls can also be used on the south and north sides of the building, but in the northern hemisphere a south wall will receive less sunlight in summer than in winter.

Cool walls tend to stay clean and reflective over time even without washing.

When To Consider this Measure

- Your home gets too warm in hot weather.
- Wall is not heavily shaded by trees or neighboring buildings.
- It’s time to paint a new wall or repaint an existing wall.

Ownership and Location

- Own Single-Family Home
- Own Condo or Townhouse*
- Rent — Short Term
- Rent — Long Term
- Live in a Historical District*

* Condominium regulations or historical building codes may limit exterior wall color.

Wall Conditions

- New Wall*
- Existing Light-Colored Wall
- Existing Dark-Colored Wall*

* May require a light-colored primer.

Weatherization Programs

- Eligible measure in California*

* Cool walls not yet included in California utility weatherization programs (but may be soon)



Tips/Cautions

- Look for a Cool Roof Rating Council (CRRC) rating label showing the solar reflectance (fraction of sunlight reflected) and thermal emittance (efficiency with which the surface releases heat by emitting radiation) of the paint, cladding, or siding product — or visit <https://coolroofs.org/walls> to find wall product ratings.
- High solar reflectance reduces solar heat gain. A dull-white or off-white wall will typically reflect at least 60% of sunlight (solar reflectance ≥ 0.60). Darker “cool colored” walls will typically reflect at least 40% of sunlight. They get warmer in the sun than light-colored walls but offer more color choice.
- High thermal emittance helps the wall release absorbed solar heat. Most wall products other than bare metals or metal-flake paints have high thermal emittance. Avoid bare metal!
- Light-colored wall paints cost the same as otherwise equivalent dark-colored wall paints.
- It is most cost effective to install a cool paint when a new wall is first painted, or when an existing wall is due for repainting.

Recommended Installer

- Do-it-yourself
- Professional painter

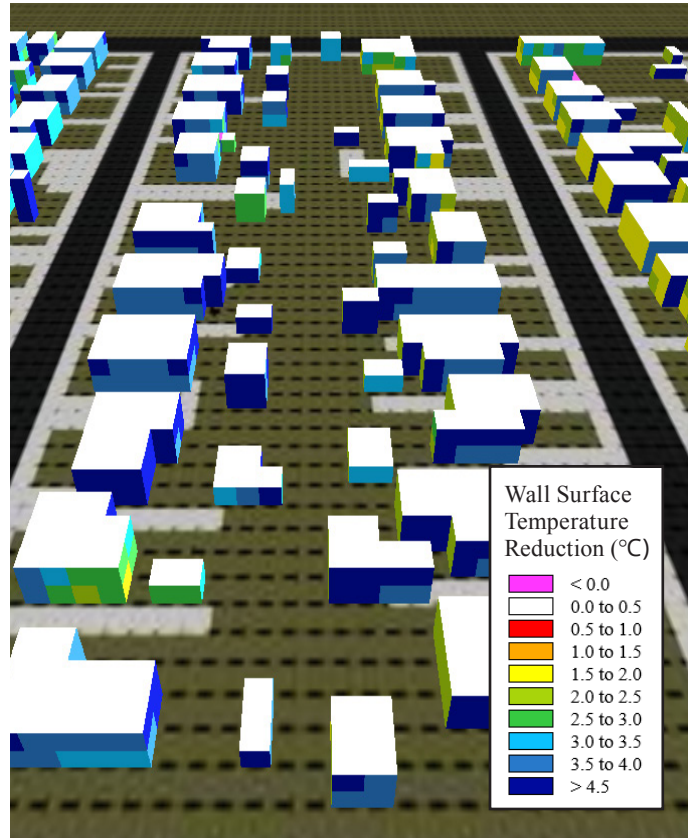
Maintenance

None. However, a cool wall, like any other wall, may be repainted at the end of its service life.

Considerations

	1	2	3	4	5
Ease of Installation (1 = easier)		X (DIY)			
Availability(1 = more available)	X				
Cost Details (1= lower cost)	X*				
Benefits: Comfort and Energy (1 = less favorable)			X		

* Incremental cost when wall is due for painting



Simulated cool wall (0.65 albedo) reduction in exterior wall surface temperature from conventional wall (0.5 albedo) at 2:00 pm local standard time (LST) during an extreme heat wave in Fresno, CA.

References

- Chen et al. (2020). Cool Walls CA & U.S. Natural exposure program: preliminary analysis of 3-year U.S. exposure results. <https://heatisland.lbl.gov/resources/Presentations>
- Levinson et al. (2019). Solar-reflective “cool” walls: benefits, technologies, and implementation. Appendix P: Cool wall application guidelines. <https://doi.org/10.20357/B7SP4H>
- Rosado et al. (2019). Potential benefits of cool walls on residential and commercial buildings across California and the United States: conserving energy, saving money, and reducing emission of greenhouse gases and air pollutants. <https://doi.org/10.1016/j.enbuild.2019.02.028>
- Zhang et al. (2018). Systematic comparison of the influence of cool wall versus cool roof adoption on urban climate in the Los Angeles Basin. <https://doi.org/10.1021/acs.est.8b00732>