



LEED BD+C: Core and Shell | v3 - LEED 2009

Heat island effect - roof

SSc7.2 | Possible 1 point

Glossary

Intent

To reduce heat islands¹ to minimize impacts on microclimates and human and wildlife habitats.

Requirements

Option 1

Use roofing materials with a solar reflectance index² (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof surface.

Roofing materials having a lower SRI value than those listed below may be used if the weighted rooftop SRI average meets the following criteria:

$$\frac{\text{Area Roof Meeting Minimum SRI}}{\text{Total Roof Area}} \times \frac{\text{SRI of Installed Roof}}{\text{Required SRI}} \geq 75\%$$

Alternatively, the following equation may be used to calculate compliance:

$$\left[\text{Area of Roof A} \times \frac{\text{SRI of Roof A}}{\text{Required SRI}} \right] + \left[\text{Area of Roof B} \times \frac{\text{SRI of Roof B}}{\text{Required SRI}} \right] + \dots \geq 0.75 \times \text{Total Roof Area}$$

Roof Type	Slope	SRI
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	> 2:12	29

OR

Option 2

Install a vegetated roof that covers at least 50% of the roof area.

OR

Option 3

Install high-albedo and vegetated roof surfaces that, in combination, meet the following criteria:

$$\frac{\text{Area Roof Meeting Minimum SRI}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.5} \geq \text{Total Roof Area}$$

Roof Type	Slope	SRI
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	> 2:12	29

Alternatively, a weighted approach may be used to calculate compliance for multiple materials:

¹ Heat islands are defined as thermal gradient differences between developed and underdeveloped areas.

² The solar reflectance index (SRI) is a measure of the constructed surface's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black surface (reflectance 0.05, emittance 0.90) is 0 and a standard white surface (reflectance 0.80, emittance 0.90) is 100. To calculate the SRI for a given material, obtain the reflectance value and emittance value for the material. SRI is calculated according to ASTM E 1980. Reflectance is measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance is measured according to ASTM E408 or ASTM C 1371.

³ For the purposes of this credit, under cover parking is defined as parking underground, under desk, under roof, or under a building.