

# Heat Island Effect

## Aim of the Credit

To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.

## Credit Criteria

1	<b>Heat Island Effect</b>	<b>1 point</b> is awarded if at least 75% of the total project site area in plan view comprises building or landscaping elements that reduce the solar reflectance of the site.
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Do you the inclusion of this issue as a standalone credit in Green Star – Design & As Built? Why or why not?

## Compliance Requirements

### 1 - Heat Island Effect

This credit is to be applied across the whole project site. The credit requires an assessment in plan view, involving a calculation of the built environment and landscape treatment in the horizontal plane only. To meet the credit at least 75% of the site comprises one, or a combination, of the following:

- Vegetation
- Green roofs;
- Roofing materials, including shading structures, having the following :
  - For roof pitched <15° a three year SRI >64;
  - For roof pitched >15° a three year SRI >34;

Only where three year SRI for products is not available use the following:

  - For roof pitched <15° an initial SRI > 82;
  - For roof pitched >15° an initial SRI > 39;
- Un-shaded hard-scaping elements with a three year SRI> 34 or an initial SRI >39;
- Hard-scaping elements shaded by overhanging vegetation or roof structures;
- Water bodies and/or water courses; and
- Areas directly to the south of vertical building elements, including green walls and shaded by these elements at the summer solstice.

Should areas to the south of the building and shaded areas be count toward credit compliance?

How should vertical elements be included in this credit? Should there be recognition of the height / plan areas ratio of the building?

### **Vegetation**

Vegetation is defined as landscaped areas, parkland, green space and trees whether new or pre existing on the site. Shading from newly planted trees is measured based on predicted spread at five years after planting.

### **Solar Reflectance Index**

The SRI is a composite measure of a material's reflectance and emittance. It is calculated as set out in ASTM E 1980.1. To calculate the SRI, the material or product's emittance values and total solar reflectance must be known. Material suppliers often provide the products SRI.

There are a number of online calculators following ASTM standard E1980-11 that can be used.

An initial SRI refers to SRI of a new product, with time the SRI will be reduced due to materials exposure to the elements, the rate of degradation over time from such exposure is measured by the SRI of the product at three years.

### **Un-shaded Hardscape**

Un-shaded hard-scape is defined as hard-scape that is not shaded by vegetation or roof material and includes roads, plazas, paths and open unshaded car parks and sports fields.

### **Water Bodies and Water Courses**

Water bodies and other permanent (not ephemeral) watercourses are to be measured to the highest natural level of the water body and/or watercourse.

### **Selection of Materials**

Hardscape paving materials are defined as all materials in roads, plazas, paths and open unshaded car parks.

Typical initial SRIs are provided below for information. These general SRIs are provided as a guide only and cannot be used to demonstrate compliance with this credit. Project specific SRIs must be identified by for the materials used.

- Grey concrete: 35
- White concrete: 86
- Standard white paint: 100
- Standard black paint: 5
- New asphalt: 0

## Guidance

### Standards and References Noted in this Credit

Lawrence Berkeley National Laboratory, *Heat Island Group Website*:  
<http://heatisland.lbl.gov/>

United States Environmental Protection Agency, *Urban Heat Island Mitigation Webpage*:  
<http://www.epa.gov/heatisl/mitigation/index.htm>

United States Environmental Protection Agency (2011), *Reducing Urban Heat Islands: Compendium of Strategies, Urban Heat Island Basics*:  
<http://www.epa.gov/heatisl/resources/pdf/BasicsCompendium.pdf>

United States Environmental Protection Agency (2011), *Reducing Urban Heat Islands: Compendium of Strategies, Cool Pavements*:  
<http://www.epa.gov/heatisl/resources/pdf/CoolPavesCompendium.pdf>

Coutts, A., Beringer, J., Jimi, S., Tapper, N. (2009), *The Urban Heat Island in Melbourne: Drivers, Spacial and Temporal Variability, and the Vital Role of Stormwater*, Monash University, Melbourne

Loh, S. (2009), *Green Roofs - Understanding Their Benefits for Australia*, Environment Design Guide, TEC 27

# Documentation Requirements

## **'Design Review' Submission (Optional)**

Project teams are to submit information/documentation marked with an asterisk\* for 'Design Review'.

## **As Built Submission**

All project teams are to submit the following documentation:

### **Submission Template**

- Summary of how the project meets the credit criteria\*
- Percentage of the site area that meets the requirements of the credit\*

### **Supporting Documentation**

Project teams are required to provide documentation supporting credit compliance. The following documents may be used to demonstrate compliance:

- **Site Plan\***  
Highlighting all relevant areas as referenced within the area schedule
- **Area Schedule\***  
Area schedule listing the areas of each of the relevant site elements and where relevant, the SRI values and referencing plan drawings for the site (highlighting relevant areas) and supplier documentation
- **Supplier Documentation**  
Material data sheet for compliant roofing and hard-scaping materials highlighting the three year or initial SRI for the product

**Please provide feedback on the technical content of this credit:**