

CHAPTER 4 - MICROCLIMATE AND OUTDOOR COMFORT

300

304.01 URBAN HEAT ISLAND EFFECT



INTENT

To reduce absolute urban temperature and day time temperature range thereby improve pedestrian and building occupant comfort and reduce cooling demand.

REQUIREMENT

For all new buildings, all opaque external roofing surfaces must comply with a minimum Solar Reflectance Index (SRI) value according to Table 304.01(1), for a minimum of 75% of the roof area:

Table 304.01(1): Roof SRI Requirements

Type of Roof	Minimum Roof SRI
Steep Sloped Roofs (slopes steeper than 1:6)	29
Flat and Low Sloped Roofs	78

SIGNIFICANCE

The Urban Heat Island (UHI) effect (fig. 304.01(1)) is the temperature difference between urban and undeveloped areas. The UHI effect occurs due to the amount of high thermal mass materials present in built up areas, such as concrete and tarmac, which are commonly used in the construction of roads, sidewalks, parking lots, buildings and roofs. These materials absorb solar radiation during the day and then re-radiate some of it, leading to temperature differences of up to 3°C between urban and the surrounding undeveloped areas.

Solar Reflectance Index (SRI) is a measure of solar reflectance and emissivity of the material. Materials with higher SRI absorb less heat and reduce the UHI effect.

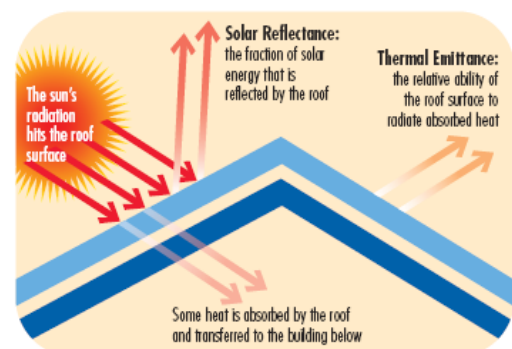


Fig 304.01(1): Urban Heat Island Effect

Solar reflectance (or reflectivity) indicates how well a material reflects solar radiation. Surfaces with a low solar reflectance are usually dark in colour and absorb a high fraction of solar radiation. The amount of energy absorption also depends on a material's specific heat capacity – how much heat they can store. The absorbed energy is then re-radiated by the material. Thermal emittance (or emissivity) indicates the ability of a material to radiate heat that it has absorbed. Surfaces with low emissivity cannot effectively radiate energy and therefore heat up.