LUXESTONE SRI Data

SRI Data

The products listed below were tested by a third party laboratory for Solar Reflectivity Index (SRI).

TEST METHOD: ASTM E1980: "Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces"

The results from ASTM C1549 and C1371 were used to calculate the solar reflectance index (SRI). Samples submitted for testing were porcelain tile only and approximately 6-in x 6-in x 8.5-mm.

Color Name	Solar Reflectance % (ASTM C1549)	Thermal Emittance (ASTM C1371)	Solar Reflectance Index (12 $W\text{-}M^{-2}\text{-}K^{-1}$)
Pearl	52%	0.87	60.50
Sandstone	43%	0.86	47.32
Driftwood	34%	0.87	36.06
Basalt	24%	0.87	22.36

* The Heat Island Reduction LEED Credit requires use of outside pavers to achieve an overall project Solar Reflectance Index (SRI) result of 29 or higher.

Solar Reflectance Index is a measurement of the solar reflectance and thermal emissivity of materials and is an indicator of how hot the material is likely to become when solar radiation is present on the surface. The lower the SRI, the hotter the material may become in direct sunlight. The higher the SRI, the greater the surface's capability to reflect and release heat from the sun.

A material's ability to remain cool is a combination of 2 factors: Solar Reflectance and Thermal Emissivity.

- **Solar reflectance** is a material's capacity to reflect solar radiation.
- **Thermal emittance** is a material's ability to release the absorbed energy.

MEASURING SURFACE TEMPERATURE

How hot a surface gets in direct sunlight is a critical factor when selecting outdoor building materials. For deck coverings, pavers, or other outdoor flooring, scorching surfaces can pose a serious risk to those who come in contact with them. For roofing and outdoor walls & facades, surface temperature is a key component in energy consumption. Solar Reflectance Index measures this crucial element on a scale of 0 to 100. Materials that absorb and retain solar radiation (and thus become hotter in direct sunlight) have a lower number, while highly reflective materials (which remain cooler in direct sunlight) have a higher number.

HEAT ISLAND EFFECT
According to the EPA, the term "Heat Island" describes developed, metropolitan areas that experience higher temperatures than nearby rural areas. Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and bodies of water. Urban areas, where these structures are highly concentrated and greenery is limited, become "islands" of higher temperatures relative to outlying areas. Daytime temperatures in urban areas are about 1-7°F higher than temperatures in outlying areas and nighttime temperatures are roughly 2-5°F higher.

White, Cream, Light Grey
These light colors have 5-20% less heat absorption and retention than concrete. Generally, light-colored materials have higher solar reflectance than dark-colored materials.

Mid-Range Grey, Tan, Beige
These colors can have the same SRI or slightly higher (up to 5%) than standard grey concrete.

Medium-Light Grey
Medium to light grey porcelain is comparable to standard grey concrete.

Dark Grey, Black, Brown
Building materials in this color palette range have a lower SRI and often test 10-22% hotter. Darker colors will generally have more heat rise in direct sunlight and are uncomfortable on bare feet.

SRI Design Considerations
- Analyze the project's ambient temperature, which will determine the importance of Solar Reflectance Index.

- It is important to note, that color is not the only indicator of reflectance. Sunlight includes ultraviolent, visible, and infrared radiation. Visible light makes up about 40% of the energy in the solar spectrum. A cool- colored material strongly reflects the invisible "near-infrared" radiation that makes up nearly half of sunlight. Replacing a standard (warm) color with a matching cool color can boost solar reflectance by as much as 0.4 without affecting appearance. (We note that a light color, such as white, is also cool, but the term "cool color" is most commonly used to describe a surface that reflects more strongly in the near-infrared spectrum than in the visible spectrum).

- Use a darker color palette in shady areas or colder climates.

- High SRI materials are vital for surfaces under all these conditions:
  - Surface is located in a warm climate.
  - Surface will be exposed to direct sunlight.
  - People are likely to walk on the surface without shoes.

- If energy consumption is a consideration for your project, utilize these factors to your advantage:
  - Employ low SRI materials for roofing and facades in cold climates to reduce energy consumption.
  - Use high SRI materials for roofing and facades in warm climates to reduce energy consumption.
  - The air gap of elevated pedestals can reduce energy consumption.
  - Use Natural Stone or Panoramic Porcelain Surfaces™ on a building's envelope to decrease urban heat Island effect.

- As materials age and experience exposure to the elements, maintenance of material surfaces is key to maintaining the SRI values the materials had at the time of installation. Porcelain has low-maintenance requirements. The colors do not fade and the surface does not erode like concrete (erosion can have a negative impact on SRI). In addition, porcelain's resistance to staining helps a light-colored porcelain paver remain cooler over time than a similarly colored concrete or natural stone paver.