# GG156-14
## 408.2.1

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**Delete without substitution:**

~~**408.2.1 Site hardscape materials.** Hardscape materials shall have an initial solar reflectance value of not less than 0.30 in accordance with ASTM E 1918 or ASTM C 1549.~~

~~**Exception:** The following materials shall be deemed to comply with this section and need not be tested:~~

1. ~~Pervious and permeable concrete pavements.~~
2. ~~Concrete paving without added color or stain.~~

**Reason:** The scientific evidence supporting the impact or effect of increasing hardscape albedo on mitigating Urban Heat Island (UHI) is extremely limited, therefore making it premature to specify reflective hardscapes as a strategy for UHI mitigation in green building construction codes. The predominant engineered traffic-bearing hardscape material is pavement. Recommending increased albedo for engineered pavement systems overlooks a history of almost 100 years of complex engineering design characteristics. The purported environmental benefits of reflective hardscapes eliminate major commercial markets of certain pavement materials, while disregarding other environmental benefits of certain materials such as recyclability and durability. Recognizing the potential for adverse impacts from specifying reflective pavements, other green rating systems, such as Federal Highway Administration (FHWA) Invest have eliminated this credit (See Background Information at http://www.fhwa.dot.gov/research/tfhrc/projects/projectsdb/projectdetails.cfm?projectid=FHWA-PROJ-13-0018.) The 408.2.1 current IgCC code section should be removed.

Much of the scientific evidence recommending an increase in material albedo for UHI mitigation is merely modeled from roofing data and has not been validated for pavements. Roofs and pavements are distinctly different materials. Endeavors that apply the same principles to pavements overlook the complexities of urban geography, including how ground-level reflections interact with pedestrians, vehicles, and the built environment. Heat concentration in urban areas is a multifaceted and context-specific problem; it requires a solution that looks at more than just one mitigation strategy and recognizes each strategy's potential negative consequences.

Specifically, a number of researchers have documented adverse unintended consequences from increasing pavement reflectivity, including increased reflected solar radiation heating-up adjacent buildings, potential for increased UV radiation, heating up the atmosphere, increased light pollution, and a host of other adverse environmental impacts. Recently, researchers from Arizona State University, surveyed a wide range of current published research on pavement reflectivity and summarized their findings in the report "Unintended Consequences: A Research Synthesis Examining the Use of Reflective Pavements to Mitigate the Urban Heat Island Effect." A copy of the report can be downloaded from the ASU National Center for SMART Innovations website at http://ncesmart.asu.edu/news/unintended-consequences.

For reason, it is premature to suggest an increased hardscape albedo to mitigate UHI. This section as it stands is based on non-validated engineering and sustainability principles. Therefore, Section 408.2.1 should be stricken and removed.

## Bibliography:

Quantifying Pavement Albedo Project Background. Eric Weaver, Ph.D. Federal Highway Agency. 2012. Available online at: http://www.fhwa.dot.gov/research/tfhrc/projects/projectsdb/projectdetails.cfm?projectid=FHWA-PR OJ-13-0018

Unintended Consequences: A Research Synthesis Examining the Use of Reflective Pavements to Mitigate the Urban Heat Island Effect. Jiachuan Yang; Zhihua Wang, Ph.D.; and Kamil E. Kaloush, Ph.D., P.E. 2013. Available online at: http://ncesmart.asu.edu/news/unintended-consequences

**Cost Impact:** Will not increase the cost of construction. This change does not impact cost of construction.