SPRI Releases Interim Report on Energy Saving Benefits of Ballasted Roofs

Waltham, MA, December 2006 — SPRI, the association representing sheet membrane and component suppliers to the commercial roofing industry has released an interim report on its study, *Evaluating the Energy Performance of Ballasted Roof Systems*. The purpose of the study is to investigate whether ballasted roofs could offer similar energy efficiency benefits as "cool" roofs and could be candidates for cool roof status from the Environmental Protection Agency (EPA), as well as other federal and code organizations. The completed interim report will be available for free download from the SPRI web site www.SPRI.org after December 1, 2006.

The research team, led by André Desjarlais of the Oak Ridge National Laboratory (ORNL), is conducting side-by-side experiments comparing ballasted roofs of differing ballast quantities/weights/methods to exposed black membranes and exposed white membranes. The study went live on March 12, 2004 with the start of data collection and will continue through March 2007.

After 24 months exposure in East Tennessee, the study has found that the heaviest gravel ballast system and pavers reduced the energy flow into the buildings to levels below the exposed white membrane. Additionally, the difference in energy performance between the lighter ballast loadings and the white membrane has decreased over the exposure period. Previous studies at Oak Ridge investigated the performance of reflective membranes. These studies have demonstrated that both heavy ballasted and exposed reflective membrane systems can reduce the energy flow into building and therefore provide energy savings in cooling dominated climates.

The results so far show that the maximum surface temperatures of the ballasted systems (90ºF - 103ºF) are significantly cooler than that of the exposed black roof membrane (146ºF), and approximately equal to the paver system. The exposed white

membrane stayed coolest, with its peak temperature topping out at only 86ºF. However, the ballast systems show a delay in peak temperature of from 30 minutes to two hours, keeping these roofs warmer in the early evening hours.

By reducing peak roof temperatures and delaying heat flow into a building, the heavy mass of ballast upon any roof provides measurable energy saving benefits, according to the interim study. However, these roofs currently do not meet the requirements of high solar reflectance and thermal emittance. Hence, the EPA and other organizations do not recognize ballasted roofs as “cool” roofing systems.

Significant findings

The East Tennessee located study has also found that the heaviest ballast system and the paver assembly have identical area densities but substantially different solar reflectances of 0.22 and 0.55 respectively after seven months. These observations strongly suggest that as the mass of ballast on a roof membrane goes up the solar reflectance becomes less relevant. The controlling parameter is the mass and not the solar reflectance.

The study is expected to produce three years of experimental data, and two research papers have already been written and presented for the project.

Data collection includes continuous monitoring of temperatures, heat flows and weather conditions, as well as periodic verification of the surface properties of solar reflectance and thermal emittance.

For updated information about this study, visit SPRI’s Web site at www.spri.org, or contact the association at info@spri.org.