

DETERMINATION OF THE CLEAR SKY EMISSIVITY
FOR USE IN COOL STORAGE ROOF AND ROOF POND APPLICATIONS

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ABSTRACT

A primary cooling component in cool storage roofs and roof pond summer cooling applications is night sky radiation. In order to determine the amount of heat rejection into the night sky, the clear sky emissivity value should be known. This paper attempts to resolve differences in work done previously by Berdahl and Fromberg at the University of California at Berkeley and by Clark and Allen of Trinity University at San Antonio. The clear night sky emissivity (ϵ_{sky}) is given as a linear equation related to dew point temperature.

The value of sky emissivity as a function of dew point temperature was obtained from measurements in Omaha, Nebraska and at Big Bend, Texas and is given by the equation

$$\epsilon_{sky} = 0.73223 + 0.006349 T_{dp}$$

where T_{dp} is dewpoint temperature in °C