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THE EXPERIMENTAL INVESTIGATION OF FORCED EVAPORATION COEFFICIENT FROM THE DISTURBED SURFACE OF HEATED WATER

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Abstract

This article presents the results of laboratory tests of water evaporation for varying air velocities over the water surface at different water wave heights. Measurements of water evaporation were conducted using the experimental setup, which consists of a wind tunnel covering a bottom-heated water tank. The investigations were carried out for water temperature higher than the intake air temperature in the range of variable air velocity from 0.40 to 0.94 m/s. The measurements were carried out for four series with heights of spatter-free wave 0, 1.5, 3.0 and 5.0 mm, respectively. The conditions were maintained in such a way that the variations in the partial pressure over the water surface were kept to a minimum.

The evaporation coefficient was defined, as the water mass transfer coefficient referred to the steady differential of water vapour partial pressures at air and water temperatures.

The novelty consists in finding a linear correlation between the evaporation coefficient and the air velocity over the disturbed water surface. However, an increase in the evaporation coefficient is directly proportional to the height of the water wave. By comparing the wave height to the coefficient of pool occupancy, a new formula for predicting evaporation is given for indoor pools.

Keywords: evaporation coefficient, humidity, temperature, thermal pool, water evaporation rate

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