



MACRO FOAM CONVECTIVE HEAT TRANSFER IN VERTICAL CYLINDRICAL TUBE

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ABSTRACT

At Energy Technology Institute various heat transfer studies with macro foam are carried out since 1998. Stable macro foam is produced by blowing air through the perforated plate and pouring water with detergent on it at the same time. Foam is mainly investigated to determine their thermodynamic properties during the heat exchange process.

This paper reports experimental data for adiabatic flow and laminar convective heat transfer of macro foam in vertical cylindrical 80 cm x 47.1 cm² tube. Validation was carried out in order to find the experimental equipment heat loss. Experimental unit were first tested with the air because of its physical properties are known. Then the experiment was carried out with different foam porosity and flow rates. The results were compared with that of the heat transfer in vertical upward and downward statically stable foam flowing across the in-line tube bundle and flat-surface cooling of two-phase flow of foam and afterwards compared with the heat transfer of colloidal gas aphrons (micro foam) in horizontal mini-channels. The results show that macro foam heat transfer coefficient falls between air and water.

Keywords: macro foam, heat transfer coefficient, vertical tube, flat surface cooling