# 마이크로 핀 배열 주위의 자연대류 열전달

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# Natural Convective Heat Transfer around Microfin Arrays

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**Key Words:** Natural Convection(자연대류), Microfin Array(마이크로 핀 배열)

**Abstract :** Natural convection around microfin arrays on the horizontal surface was experimentally studied. Different correlations between Rayleigh number and Nusselt number from the macro-scale fin geometry were observed due to the change of force balance among inertia force, viscous force and buoyancy force. Micro fin geometries with the height of 200 μm and three different spacings of 70, 100, 130 μm were fabricated using DRIE(Deep Reactive Ion Etching) process. The heat transfer coefficient was obtained from the transient behavior of the wall temperature in order to minimize the effect of the conduction loss. Test results were compared with the existing correlations and numerical predictions.



# 간접 가열방식의 연속식 열처리로내 판(Plate)의 전열해석

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# Thermal Analysis of the Plate in Indirectly-Fired Continuous Heat Treatment Furnace

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**Key Words:** Heat Treatment Furnace(열처리로), Thermal Analysis(전열 해석), View Factor(형태계수), Plate(판)

**Abstract :** In this study, numerical simulation has been performed by considering the convective and radiative heat transfer to predict the transient thermal behavior of the plate in indirectly-fired continuous heat treatment furnace. The temperature profiles in the plate are determined using transient one-dimensional heat conduction equation. To verify the validity of the present numerical results, the present results obtained from the transient analysis are compared with those of experiments. Extensive parametric investigations are performed to examine the effects of the emissivities of the plate and refractory, charging temperature and residence time of the plate as well as gas temperature of the work side and drive side in a heat treatment furnace, on the thermal behavior of the plate.