
SESSION 15: Regenerator / Recuperator Investigations

Paper 15.1

Thursday ORAL Session

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Temperature Profiles in Regenerators with Thermal Break Slots

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The best regenerator structure in terms of maximum heat exchange for minimum viscous loss penalty is a stack of parallel plates. However, if the plates are manufactured from solid metal foil, then the solid conductivity of the plates may add a prohibitive parasitic thermal conduction path. Using chemical etching attempts have been made to manufacture parallel plate regenerator analogs with thermal break slots to reduce the solid conduction. The solid and gas temperature profiles in such a structure are modified from the parallel plate results and may no longer be adequately modelled with standard parallel plate regenerator calculation methods. In particular, the thermal breaks lead to a staircase temperature profile in the solid which results in an addition to the total power flow that counteracts the reduction in solid conduction. The gas and solid temperature profiles in the presence of thermal break slots are calculated and compared to parallel plate results. These results show that there is a structural addition to the total power in such regenerators.