ANALYTICAL SOLUTION FOR EFFECTIVENESS AND ENTROPY PRODUCTION IN REGENERATIVE PROCESS

Viorel POPA,
University „Dunarea de Jos" of Galati, ROMANIA
viorel.popa@ugal.ro

ABSTRACT

Thermal regenerator is studied from the viewpoint of irreversible entropy production. Analytical expressions of temperature changes of the regenerator matrix and working substance are presented for a model regenerator with a massive working substance. They are shown to be very useful in evaluation of entropy production in the regenerative process and in analyzing regenerative thermal cycles. Rigorous expressions for entropy production and regenerator effectiveness are also given in terms of the dimensionless parameters: number of transfer units and heat capacity ratio between the working substance and regenerator matrix. The difference in character of the working substances between our model and the usual gas regenerator is shown to cause differences of heat capacity dependence of regenerator effectiveness between them.

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