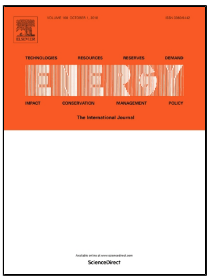
Accepted Manuscript



Experimental and numerical investigations on the effect of suction chamber angle and nozzle exit position of a steam-jet ejector

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PII:	S0360-5442(18)31764-X
DOI:	10.1016/j.energy.2018.09.010
Reference:	EGY 13704
To appear in:	*Energy*
Received Date:	07 June 2018
Accepted Date:	02 September 2018

Please cite this article as: A.S. Ramesh, S. Joseph Sekhar, Experimental and numerical investigations on the effect of suction chamber angle and nozzle exit position of a steam-jet ejector, *Energy* (2018), doi: 10.1016/j.energy.2018.09.010

Experimental and numerical investigations on the effect of suction chamber angle and nozzle exit position of a steam-jet ejector

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Abstract

Implementation of renewable energy in existing applications has become an emerging trend in order to mitigate the environmental issues. Specifically, HVAC sector urges for more efficient and eco-friendly systems which can effectively replace the high grade energy in conventional systems. One of such promising environmental friendly systems is the ejector refrigeration system which has low initial and operating costs, simple system components and trouble free operation. In spite of these merits, it suffers from low performance due to the complex irreversible fluid flow prevailing in the ejector. Comprehensive analysis and understanding of all the geometrical and operating parameters governing the ejector flow are vital for increasing the performance of the entire system. In this study, the most crucial geometrical parameters such as suction chamber angle and the Nozzle Exit Position (NXP) of a steam operated ejector are systematically investigated using CFD and experimental techniques. The influence of operating conditions with respect to the geometrical parameters has been observed, and for the tested conditions of 700 W evaporator at 10 °C cooling temperature the suction chamber angle of 12° and the corresponding NXP of 24.7 mm delivered an optimum performance for the active and back pressures of 2 bar and 43 mbar respectively.

Keywords: Ejector; Suction chamber angle; NXP; CFD; Experimental study