Investigation and improvement of ejector refrigeration system using computational fluid dynamics technique

Author(s): Pianthong K (Pianthong, K.), SeehanaM W (SeehanaM, W.), Behnia M (Behnia, M.), SriveerakUl T (SriveerakUl, T.), Aphornratana S (Aphornratana, S.)

Source: ENERGY CONVERSION AND MANAGEMENT **Volume:** 48 **Issue:** 9 **Pages:** 2556-2564 **Published:** SEP 2007

Abstract: Ejector refrigeration systems are usually designed to utilize low grade energy for driving the cycle. They also have low maintenance cost because they operate without a compressor. Mainly, the ejector performance directly affects the refrigerating performance. Therefore, an investigation on the characteristics and an efficient design of the ejector are important to improve ejector refrigeration systems. In this study, the computational fluid dynamics (CFD) code, FLUENT, is employed to predict the flow phenomena and performance of CPM and CMA steam ejectors.

The ejector refrigeration system, using water as the working fluid, is operated at 120-140 degrees C boiler temperature and 5-15 degrees C evaporator temperature. CFD can predict ejector performance very well and reveal the effect of operating conditions on an effective area that is directly related to its performance. Besides, it is found that the flow pattern does not depend much on the suction zone because the results of axisymmetric and 3D simulation are similar. This investigation aids the understanding of ejector characteristics and provides information for designing the ejector to suit the optimum condition. (c) 2007 Elsevier Ltd. All rights reserved.

Document Type: Article

Language: English

Author Keywords: ejector; ejector refrigeration; computational fluid dynamics (CFD)

KeyWords Plus: PETAL NOZZLE; STEAM; ENHANCEMENT

Reprint Address: Pianthong, K (reprint author), Ubon Ratchathani Univ, Dept Mech Engn, Ubon Ratchathani 34190,

Thailand

Addresses:
1. Ubon Ratchathani Univ, Dept Mech Engn, Ubon Ratchathani 34190, Thailand
2. Univ Sydney, Postgrad Study, Sydney, NSW 2006 Australia
3. Thammasart Univ, Dept Mech Engn, Sirindhorn Int Inst Technol, Pathum Thani 12121, Thailand

E-mail Addresses: K_Pianthong@yahoo.com

Publisher: PERGAMON-ELSEVIER SCIENCE LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND

Subject Category: Thermodynamics; Energy & Fuels; Mechanics; Physics, Nuclear

IDS Number: 206RD

ISSN: 0196-8904

DOI: 10.1016/j.enconman.2007.03.021