

عنوان مقاله:

3D Flow Simulation Inside a Desuperheater

محل انتشار:

یازدهمین کنفرانس بین المللی مهندسی مکانیک، مواد و متالورژی (سال: 1402)

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نویسندگان:

Mohammad Saadatbakhsh - Assistant Professor, Mechanical Engineering Department, Kharazmi University. Visiting Professor, School of Advanced Technologies, Iran University of Science and University, Tehran, Iran

Hooman Nowroozlou - M.Sc. Student, Mechanical Engineering Department, Kharazmi University, University, Tehran, Iran

Fallah Mahmoudi Surman Abad - M.Sc. Student, Mechanical Engineering Department, Kharazmi University, University, Tehran, Iran

Kasra Habibi - B.Sc. Student, Mechanical Engineering Department, Kharazmi University, University, Tehran, Iran

خلاصه مقاله:

One of the methods used to decrease the superheated vapor temperature is the implementation of desuperheaters which by using cool water injection, maximization of evaporation surface and droplet evaporation lead to a reduction in superheated vapor temperature. In this paper, a desuperheater which utilizes surface injection from its inlet as desuperheater's injector is simulated by using the discrete phase model (DPM) that is based on eulerian-lagrangian approach. Heat transfer between water droplets and superheated steam is simulated as a biphasic 3D flow in ANSYS FLUENT by considering standard k-ε turbulence model. The effect of water droplets diameter, pipe diameter and superheated steam's mass flow rate at the inlet on evaporation rate and outlet steam temperature has been studied. The results suggest that with a reduction in water droplets diameter and an increase in pipe diameter, the contact surface between the two phases increase, thus lowering the length required for complete evaporation.

کلمات کلیدی:

"Desuperheater, Numerical simulation, DPM, Thermal desalination"

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