

Double Stator 환단면 선형유도전자펌프의 구동 특성 해석 Characteristic Analysis of a Double Stator Annular Linear Electromagnetic Pump

김희령, 김종만, 박진호, 남호윤
한국원자력연구소

김태룡
전력연구원

요약

액체금속로 소듐 냉각재 이송을 위하여 일반적으로 환단면 선형유도전자펌프가 사용되고 있다. 본 연구에서는 대유량의 소듐 순환용으로 주목 받고 있는 double stator 형의 환단면 선형유도전자펌프에 대한 구동 입출력 방정식을 이론적으로 도출하였다. 이때 펌프 기하학적 및 전기적 설계 변수들로 표현되는 압력차-유량을 관계식을 프로그램화하여 실제 개발되고 있는 double stator version의 ALMR 전자 펌프에 적용하였다. 유도된 구동 방정식의 타당성을 검증하기 위하여 입력 전류에 따른 유량-압력차 특성을 기존의 자료들과 비교 검토하였다.

Natural Circulation Flow Loop Analysis for a Liquid Metal Reactor

Jong-Eun Chang, Kune Y. Suh
Seoul National University

Abstract

First-principle calculations were performed to characterize natural circulation heat removal from the core of a liquid-metal reactor (LMR). The lead-bismuth (Pb-Bi) was chosen as the primary coolant for the LMR system. The Pb-Bi coolant has a good natural circulation capability during a decay heat removal condition. The temperature difference between the thermal centers of the heat source (core) and the heat sink (steam generator) induces the density change, which provides with a driving force during a natural circulation condition. A one-dimensional flow loop model was used to analyze the state of a normal operation. The amount of natural circulation heat removal was evaluated utilizing a simplified flow loop model. A total pressure drop of 200kPa was calculated. The elevation difference of 4.5m between thermal centers of the core and the steam generators could remove as much as 10% of the normal reactor power. The core lumped temperature increase was within 100K from the initial temperature during the normal operation.