

태양에너지 해수담수화를 위한 3중 효용 증발식 담수기 개발

*황 인선, 주 흥진, 윤 응상, **곽 희열

Development of 3th Effects Evaporative desalination system for Solar Desalination System

*In-Seon Hwang, Hong-Jin Joo, Eung-Sang Yun, **Hee-youl Kwak

The evaporative desalination system with solar energy would be the efficient and attractive method to get fresh water. This study was described the development of Multi Effect Distillation(MED) with solar energy desalination system. The system was designed and manufactured Multi effect distillation on the capacity of 3 m³/day. The experimental apparatus consists mainly of ejector pump, Hot water pump, flow meter, demister, cooler, evaporator and condenser. Evaporator and condenser were made Shell&Tube Heat Exchanger type with corrugated tube. The experimental variables were chosen 75°C for hot water inlet temperature, 40, 60 and 80 ℓ/min for hot water inlet volume flow rate, 6.0 and 8.0 ℓ/min for evaporator feed seawater flow rate, 18°C for sea water inlet temperature to cover the average sea water temperature and the salinity of sea water is measured about 33,000 PPM (parts per million). for a year in Korea. This study was analyzed the results of thermal performance of Multi Effect Distillation. The results are as follows, The experimental Multi effect distillation is required about 40 kW heat source for production of 3 m³/day fresh water. Various operating flow rate was confirm in the experiments to get the optimum design data and the results showed that the optimum total flow was 8.0 ℓ/min. Comparison of Single Effect Distillation with Multi Effect Distillation showed MED is at least more than double of SED.

Key words : Sea Water Desalination(해수담수화), Multi Effect Distillation(다중 효용 담수 장치), Single Effect Distillation(단일 효용 담수 장치), Solar Energy(태양에너지), corrugated tube(나선관), Shell&Tube Heat Exchanger(셸 앤 튜브 열교환기), Fresh water(담수)

E-mail : * ishwang@kier.re.kr, ** hywak@kier.re.kr