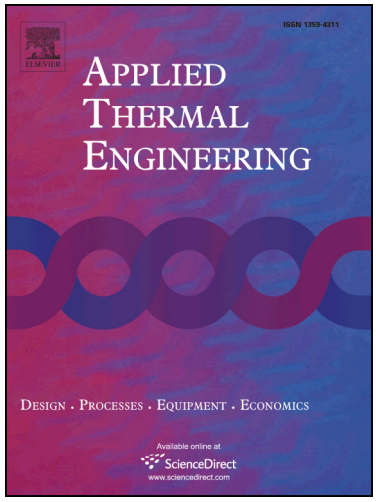

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Study on mechanical vapor recompression system with wet compression single screw compressor

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Abstract

The mechanical vapor recompression (MVR) is a highly energy-efficient process, in which the compressor is the core unit. In order to improve the compressor efficiency the distilled water is atomized and injected into the compressor to cool down the overheated vapor during compression. The performances of the system with water injection compressor were tested and compared with a common compressor without water injection. Four groups of tests with different water spray rate were analyzed experimentally. The tests show that without water injection, the temperature difference increases sharply with frequency rising. It also shows that the values of compression ratio and evaporation capacity increase with the frequency increasing, and the values vary with the spray flow rate: the higher the flow rate, the larger the values. The values for the situations with water injection are closer to each other with the increasing of the water spray rate while the situation without water injection is much lower. Specific moisture extraction rate, abbreviated as SMER is a parameter which reflects the removal water from the feed per kilowatt hour. With spray flow rate of 300kg/h the SMER is 34 kg/kWh at frequency of 20Hz while the value is 25 kg/kWh without water injection.

Key words: recompression; water injection; vapor compressor; SMER

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