

عنوان مقاله:

Passive Energy Air-to-Water Heat Pipe Based Heat Exchanger and its Potential of Air Pre-cooling in Air Conditioning Systems for Iran Climate

محل انتشار:

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خلاصه مقاله:

Air pre-cooling equipment is normally being employed in air-conditioning systems for pre-cooling the ambient outdoor air to enhance the air-conditioning systems performance. In this study, the potential of a passive water-to-air heat pipe based heat exchanger (HPHEX) for air pre-cooling purpose in air-conditioning systems for the high cooling load demanding regions of Iran was investigated. To this end, effectiveness-NTU approach was employed to determine the thermal performance of the heat exchanger. Water-to-air HPHEX with different numbers of rows namely two, four, and six was studied to determine the heat transfer characteristics of the heat exchanger. The thermal performance of the water-to-air HPHEX was investigated under different operating conditions in terms of evaporator inlet air and condenser inlet water coil face velocities and temperatures. After determining the thermal performance of the water-to-air HPHEX, the air pre-cooling capability of the water-to-air HPHEX was explored hour-by-hour for the required months of the year by using TRNSYS software. Based on the simulations results, the water-to-air HPHEX shows an acceptable thermal performance under the operating conditions. In addition, studies showed that the water-to-air HPHEX has a significant capability for air pre-cooling, which makes it applicable to be implemented in the air-conditioning systems operating in south of Iran.

کلمات کلیدی:

Effectiveness-NTU, Heat Pipe based Heat Exchanger (HPHEX), Air Pre-Cooling, Thermal Performance

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