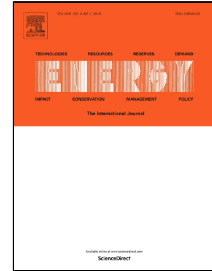


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A comprehensive review of the Maisotsenko-cycle based air conditioning systems

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A comprehensive review of the Maisotsenko-cycle based air conditioning systems

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Abstract: Maisotsenko cycle (M-cycle) is a promising air cooling technique which can reduce the temperature of air flow until dew point which was not possible either in direct contact techniques or former indirect evaporative methods. M-cycle systems have been employed previously on gas turbines, air conditioning systems, cooling towers, electronic cooling etc. Simultaneous consideration of all of them prevents detailed presentation. For that reason and because of the wide application of air conditioning systems, this paper focuses only on the use of M-cycle on air conditioning systems. Moreover, former types of indirect evaporative air coolers which do not work based on Maisotsenko cycle are not considered in the present study. Researchers have evaluated the M-cycle characteristics via different methods including analytical solution, numerical simulation, statistical design methods and experimental-techniques all of which is divided into several categories as well. All said methods are organizedly discussed and compared in this paper. It has been tried to provide an evolutionary viewpoint for analytical solutions of M-cycle. Thus, analytical solutions were reorganized with unique abbreviations in order to become more understandable and comparable with each other. All M-cycle parameters (which have been analyzed via numerical or experimental ways) are coherently systematized and then a comprehensive-compact view of obtained results is presented. Finally, the current status of M-cycle industry is summarized and the future research direction on M-cycle is proposed.

Keywords: Heat exchanger, Maisotsenko cycle, Evaporative, Dew-point, Wet-bulb, Air conditioner

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