

论文

自然通风冷却塔进风口流场模型的建立及计算

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摘要:

冷却塔的运行状况对电厂的经济性和安全性有较大影响.环境侧风严重影响冷却塔的冷却性能.以逆流湿式自然通风冷却塔为研究对象,建立了冷却塔进风口附近空气流动的数学模型和冷却塔内传热传质的物理模型.采用有限体积法进行了数值计算.得到了冷却塔进风口附近空气动力场的分布规律,同时进行了实型塔的现场测量,与模拟结果对比.该方法可定量评价冷却塔的运行状况,为冷却塔通风量和进风阻力的计算,以及冷却塔全面优化设计和改善冷却塔的冷却性能提供了理论依据.

关键词: 冷却塔 空气动力场 数值模拟 进风口 FLUENT

Mathematical model and numerical simulation of the air inlet flow field of a natural-draft cooling tower

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Abstract:

The performance of a cooling tower has great effects on the economy and security of a power plant, which is badly affected by cross winds. A mathematical model of the air inlet aerodynamic field of a natural draft wet counter flow cooling tower was established. A heat and mass transfer model of the tower is built as well. In addition, a detailed numerical simulation was provided by the finite volume method. Distribution rules of the air inlet aerodynamic field were studied. Field experiments were put forth in a cooling tower of a power plant, of which the data obtained were compared with simulated data. It can be used to evaluate the performance of a cooling tower and to calculate the ventilation quantity and resistance of the air inlet. It also provides theoretical proofs for the design and performance optimization of a cooling tower.

Keywords: cooling tower aerodynamic field numerical simulation air inlet FLUENT

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