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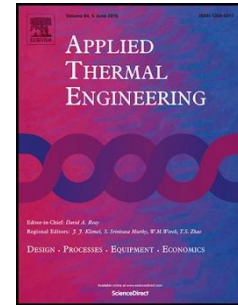
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## Influence of Non-uniform Layout Fillings on Thermal Performance for Wet Cooling Tower

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### Highlights

- Performance of cooling tower under non-uniform layout fillings is outstanding.
- Optimal layout pattern is that  $r_a/r_c$  is approximately 0.44 and  $r_b/r_c$  is around 0.71.
- Performance of optimal layout pattern can enhance by 30% at maximum within the scope of this test.
- Conclusions can lay important theoretical foundation concerning future research.

**Abstract:** Based on the similarity theory, thermal-state model experiment in lab is performed to investigate the thermal performance of wet cooling towers under different layout patterns of fillings, and five kinds of layout patterns, including uniform layout and **four kinds of non-uniform layout patterns**, are studied in this paper. Experimental results manifest that the thermal performance of wet cooling towers under non-uniform layout patterns is outstanding by calculating and analyzing five performance parameters **which are cooling temperature difference, cooling efficiency, Merkel number, Lewis number and ratio of evaporative heat rejection**. Additionally, research also obtained the optimal **three-block layout pattern of fillings in which the radius ratio of  $r_a/r_c$  is approximately 0.44 and  $r_b/r_c$  is around 0.71**, here  $r_a$ ,  $r_b$  and  $r_c$  are the radius of three blocks, respectively. **What's more**, compared with the uniform

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