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Using capsulated liquid metal fins for heat transfer enhancement

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Abstract: This work introduces a novel method that enhances the heat transfer from a given surface by using a capsulated liquid metal fin. The thermal performance of this fin is estimated and compared with that of a conventional solid fin. It is found that using the capsulated fin may enhance the performance of an equal size conventional solid fin significantly. The effect of different design and operating parameters on the capsulated fin thermal performance is investigated. Two equal-size geometries for the capsulated fins longitudinal sectional area are investigated: the rectangular and the half-circular fins. It is found that the rectangular fins show better performance than that of the halfcircular fins. Also, it is found that using the capsulated fin is justified in applications that involve a high base temperature, high height-towidth aspect ratio, and high external convective heat transfer coefficient.