Jet Impingement On Cylindrical Cavity: Conical Nozzle Considerations

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Summary

In laser gas-assisted processing, the assisting gas emerges from a nozzle and nozzle geometric configurations alter the flow structure and heat transfer characteristics in and around the section processed. In the present study, the influence of nozzle geometric configurations, cavity diameter and depth, on flow structure and heat transfer rates from the cavity is investigated. A cylindrical cavity with two diameters and varying depths is accommodated in the simulations. Air is used as assisting gas while steel is employed as workpiece material. A numerical scheme using a control volume approach is accommodated to discretize the flow and energy equations. It is found that flow structure changes significantly for large diameter cavity. The influence of the nozzle cone angle on heat transfer and flow structure is more pronounced as the cavity depth increases.

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