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钻孔式气膜冷却火焰筒壁温计算

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CALCULATION OF WALL TEMPERATURE OF FLAME TUBE WITH HOLE-DRILLED FILM-COOLED CONSTRUCTION

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摘要

关键词： 气膜冷却 火焰筒 壁温 数值解

Abstract： This paper deals with a numerical method tor calculating the wall temperature profile of turbo-jet dame tube with hole-drilled film-cooled construction. Some factors affecting the accuracy of calculation of wall temperature, such as longitudinal conduction in the flame tube wall, contact conduction at the joints of the film cooling sections, convection on the end surfaces of the film cooiing sections, the temperature rise of the secondary cooling air in the annular cooling passage andl the variation of physical properties with temperature, are considered. A convection-conduction-radiation coupled iterative method is used to solve the problem with complex boundary conditions including longitudinal conduction between two individually cooled louvers. As an example, the wall temperature profile of WP-7B flame tube with hole drilled film-cooled construction has been calculated. Owing to improvement of the calculation method, the calculated temperature profile agrees well with that shown by thermal paint.

Keywords： film cooling flame tube wall temperature numerical solution

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