



Heat Transfer from Flame Impingement Normal to a Plane Surface

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VDM Verlag Jun 2009, 2009. Taschenbuch. Book Condition: Neu.

235x154x15 mm. Neuware - Impinging flame jets have been widely studied because of their importance in a range of applications such as materials processing and fire safety. The purpose here was to determine the importance of radiation, convection, and thermochemical heat release (TCHR) under a range of conditions. Natural gas was premixed with oxidants ranging from air to pure oxygen in a round burner that produced uniform exit conditions. Flames impinged perpendicular to a water-cooled flat disk segmented into 6 concentric calorimetric sections to measure radial heat flux distribution. Many parameters were varied such as firing rate, burner-to-disk spacing, oxidant composition and disk surface treatment. Untreated, polished, blackened, alumina-coated and platinum-coated disk surfaces made of stainless steel, copper or brass were tested. High (blackened) vs. low (polished) emissivity surfaces showed nonluminous gaseous radiation was less than 10% of the total heat flux. Noncatalytic (alumina) vs. catalytic (platinum) surfaces showed that TCHR was only important for high O₂ oxidants. The radial location of the highest heat flux depended on oxidant composition. 172 pp. English.



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