

## عنوان مقاله:

Effect of Slot-Guidance and Slot-Area on Air Entrainment in a Conical Ejector Diffuser for Infrared Suppression

## محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 12، شماره 4 (سال: 1398)

تعداد صفحات اصل مقاله: 16

## نویسندگان:

L. Singh - Department of Applied Mechanics, Indian Institute of Technology Delhi, New Delhi, 110016, India

S. N. Singh - Department of Applied Mechanics, Indian Institute of Technology Delhi, New Delhi, 110016, India

S. S. Sinha - Department of Applied Mechanics, Indian Institute of Technology Delhi, New Delhi, 110016, India

## خلاصه مقاله:

A numerical study has been carried out on a new design of ejector diffuser (infrared suppression device). New design conceptualizes exploiting the shape of the slot openings. A circular arc is provided to guide the entrained fluid at the slot openings. Performance of guided-slot ejector diffuser (GED) has been compared with conventional (non-guided-slot) ejector diffuser (NGED) in terms of local and cumulative mass entrainment ratios, temperature distribution and static pressure recovery. Three slot-area variations are also studied, namely (i) increasing slot-area ranging  $1 \leq A_0 \leq 2.02$ , ( $A_0$  is area of 1st slot) (ii) constant slot-area  $A_0 = 1$  and (iii) decreasing slot-area ranging  $0.49 \leq A_0 \leq 1$ . Simulations have been carried out at fixed Reynolds number  $Re = 1.3 \times 10^5$ . It is observed that GED has 3.5% higher cumulative mass entrainment ratio than NGED. GED forms cold annulus region below ejector diffuser wall from slot onwards which results in wall temperatures being close to ambient temperature (300 K). Higher mass entrainment rate and lower wall temperatures make GED a better infrared suppression device but static pressure recovery is better in NGED ( $C_p = 0.79$ ) compared to GED ( $C_p = 0.43$ ). Slot-area study reveals that the performance of increasing slot-area for GED and NGED is superior than constant and decreasing slot-area configurations. The cumulative mass entrainment is 20% higher while static pressure recovery is 45% more for the increasing slot-area GED when compared to the decreasing slot-area GED.

## کلمات کلیدی:

Mass entrainment, Slot openings, Heat signatures, Static pressure recovery, Numerical study

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1369673>

