

عنوان مقاله:

Experimental and Numerical Investigation of a ۶۰cm Diameter Bladeless Fan

محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 9، شماره 2 (سال: 1395)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

Bladeless fan is a novel type of fan with an unusual geometry and unique characteristics. This type of fan has been recently developed for domestic applications in sizes typically up to ۳۰cm diameter. In the present study, a Bladeless fan with a diameter of ۶۰cm was designed and constructed, in order to investigate feasibility of its usage in various industries with large dimensions. Firstly, flow field passed through this fan was studied by ۳D modeling. Aerodynamic and aeroacoustic performance of the fan were considered via solving the conservation of mass and momentum equations in their unsteady form. To validate the acoustic code, NACA ۰۰۱۲ airfoil was simulated in a two dimension domain and the emitted noise was calculated for $Re=۲\times ۱۰^۵$. Good agreement between numerical and experimental results was observed by applying FW-H equations for predicting noise of the fan. To validate the simulated aerodynamic results, a Bladeless fan with a ۶۰cm diameter was constructed and experimentally tested. In addition, the difference between the experimental and numerical results was acceptable for this fan. Moreover, the experimental results in the present study showed that this fan is capable to be designed and used for various industrial applications

کلمات کلیدی:

۳Dsimulation, Bladeless Fan, Fw, Computational fluid dynamics (CFD), hnoise Formulations

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