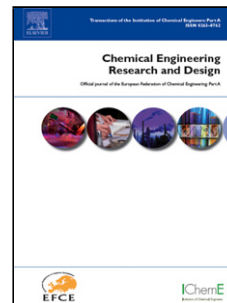


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Authors: Xing Huang, Timothy A.G. Langrish, Ali Abbas, David F. Fletcher



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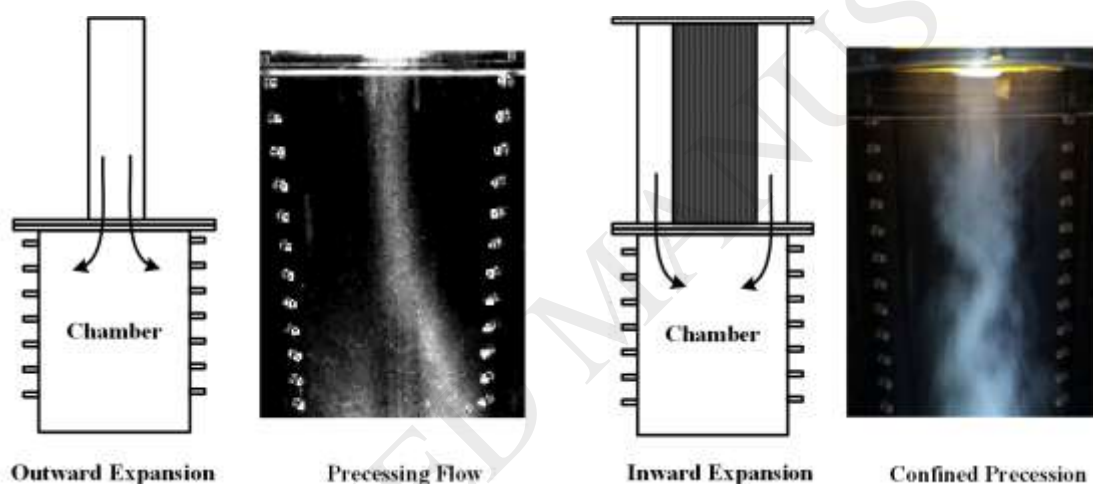
Investigation of the Flow Patterns Produced from Sudden Expansion Geometries using Pressure Difference Measurements and Flow Visualisation Techniques

Xing HUANG, Timothy A. G. LANGRISH, Ali ABBAS, and David F. FLETCHER

*School of Chemical and Biomolecular Engineering, University of Sydney, NSW
2006, Australia*

*E-mail: xing.huang@sydney.edu.au; timothy.langrish@sydney.edu.au;
ali.abbas@sydney.edu.au; david.fletcher@sydney.edu.au*

Graphical abstract



Highlights

- Outward and inward expansions produced swirls with different frequencies.
- Flow produced by the inward expansion showed relatively higher stability.
- The study showed connection between flow behaviours and expansion geometries.

1 Abstract

The aim of this study was to investigate the flow behaviour produced from inward sudden and outward expansion geometries. A flow apparatus made of Perspex has been used to measure the variations of pressure differences, and to observe the visualised flow streams, downstream of the expansions. For the outward expansion, the pressure measurements showed two types of oscillations: low frequencies at around 1 Hz and high frequencies at around 10 Hz. The oscillations at low frequencies have been found to be more dominant and related to the precession of the air flow. Further pressure measurements, together with the visualisation results, showed that this precessing behaviour was stronger near the wall of the expansion chamber. In comparison, the pressure measurements in the inward expansion showed higher overall flow stability. Measurements at different radial distances showed that the low-frequency

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