

Abstract Submitted
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Experimental study of interfacial structure of a falling liquid film in a vertical pipe¹ ABBAS HASAN, BARRY AZZOPARDI, BUDDHIKA HEWAKANDAMBY, University of Nottingham — Many studies in the literature provide time series data of the film thickness at one or two points on the pipe wall. Most of these studies focussed on either flat plates or small diameter pipes. The main aim of this paper is to study the characteristics of the interfacial wave structure of falling liquid films (liquid Reynolds numbers: 618-1670) in a large diameter pipe (127 mm) using a Multiple Pin Film Sensor (MPFS) which is capable of providing measurements of film thickness and interfacial waves with excellent resolution in time and in the circumferential and axial directions. Parameters, such as film thicknesses, wave velocities and frequencies were extracted. 3D interfacial wave structures were reconstructed from the film thickness data. Unlike the waves in smaller diameter pipes which are characterised as coherent rings, the waves seen in this study were much localized. The mean film thicknesses are generally in good agreement with published models. The mean film thickness obtained from MPFS was also compared with the conductance ring pairs. There is good agreement between the two methods particularly when the fact that the ring pair technique provides a circumferentially averaged value.

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Omar Matar
Imperial College London

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