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ABSTRACT

The squeeze flow test provides relevant information about the macroscopic rheological behavior of mortars. Nevertheless, the identification and characterization of micro and meso physical phenomena is necessary for a more thorough analysis. This work presents an experimental methodology that combines the squeeze flow test with a pressure mapping system for the rheological evaluation of cement-based mortars. Two compositions were analyzed, with and without viscosity modifying cellulose ether based admixture, and the liquid phase migration was quantified to support the interpretation of the results. The developed pressure mapped squeeze flow (PMSF) method allowed for reliable measurement of the evolution of the pressure distribution on the whole area of the squeezed sample, and the results were compared with theoretical models for different flow types of Newtonian fluids. The presence of the cellulose ether admixture resulted in more homogeneous flows, which enabled bigger displacements and generated less fluctuations in the pressure distributions.

Key words: mortar; squeeze-flow; pressure mapping; pressure distribution; phase separation.

1 INTRODUCTION

The squeeze flow test is based on the compression of a sample between two parallel plates subjecting the material to shear and/or elongational radial flows. and has been widely employed for the rheological evaluation of foods, biofluids, cosmetics, polymers, ceramics, composites and several other classes of materials [1]. It is an useful technique that does not display some issues that may take place in rotational rheometry such as: interfacial slip that can invalidate the results, disruption of plastic materials, the difficulty to load highly viscous fluids or soft solids, and fiber ball up in polymeric or cementitious composites [1–6]. Furthermore, the ease of execution of the method with

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