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Blockages Associated with Defluidization and Refluidization of Narrow Beds[1] FERNANDO CÚÑEZ, ERICK FRANKLIN, University of Campinas-UNICAMP, GRANULAR LAB TEAM — Fluidized beds are widely found in industrial applications due to their high rates of heat and mass transfers. In the case of narrow beds, different behaviors are induced by high confinement effects, such as the formation of alternating regions of high and low compactness known as plugs and bubbles, respectively. When the fluid velocity is reduced (defluidization), unusual behaviors can occur at velocities still above that for minimum fluidization, U_{mf}. Here, we present experiments in narrow fluidized beds, for which we performed defluidizations where we kept fluid velocities above U_{mf}, and we varied the grain types and deceleration rates. Once the defluidization process reaches velocities slightly higher than U_{mf}, for which fluidization should occur, the macroscopic motion stops: grains are arranged in lattice structures occupying all the tube cross-section, and presenting small fluctuations. Afterward, if the fluid velocity is slightly increased, a jamming state is reached, where grains are completely trapped and their fluctuations disappear. Our results raise the questions of fluidization conditions and minimum fluidization in narrow beds.

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