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Sings of Flooding Instability in Inclined Liquid Films at High Pressure and Mass Transfer in High Density Gas Slugs

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The influence of gas density on flooding instability phenomena is investigated experimentally both in long gas slugs of CO2 rising in vertical tubes filled with water at pressures up to 5.2 MPa, and inside a rectangular column, with flat walls, positioned in the vertical and at 15ş, 45ş and 60ş from the horizontal, at absolute pressures up to 0.6 MPa with air and up to 1.5 MPa with argon, at Reynolds numbers for the water between 2667 and 26667. The experiments have shown, despite some scepticism about the possibility of occurrence of flooding instability at low gas velocities recorded, that there is a critical value of rg(u + ui)2 above which flooding instability sets in, for a given liquid at a given flow rate in a given column (where rg is the density of gas, u the average velocity of gas and ui is the liquid velocity on gas-liquid interface).

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