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**Gravity-driven Propagation of Thin Non-isoviscous Rivulets on Vertical and Inclined Planes** GAOZHU PENG, ANDREY FILIPPOV, Corning Incorporated — Many practical problems require the spreading of a liquid on a solid. The liquid may be paint, a lubricant, and ink, polymer, or a dye. In the glass industry, flows of molten glass on a vertical or inclined, in respect to the vertical, solid refractory surface are parts of several important applications. In present paper, propagation of a thin and relatively narrow rivulet on vertical and inclined solid planar surface is considered within a mathematical frame of general lubrication theory. In contrast to most of previous studies, the addressed flows are gravity driven, and the coefficient in front of the surface tension term in the dimensionless equations (the inverse Bond number) is small. It has been found that the flow pattern strongly depends on the inclination angle. For example, the rivulets on the positively inclined plates spread, increasing their width. On the contrary, the contact line of rivulets propagating on vertical and negatively inclined plates becomes unstable, sending ahead one or several smaller forerunner rivulet (finger) having a higher amplitude and moving faster than the main rivulet. This instability is similar to fingering instability of infinite films on solid surfaces, but the pattern of the flow was symmetric in respect to the middle line of the rivulet rather than a periodic. In the case of the gradient of viscosity applied in the cross-direction to the main flow, the symmetry broke and motion of both main rivulet and forerunners diverted in the direction of areas with lower viscosity.

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