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Effect of Swirl on Flickering Motion of Diffusion Flame HIROSHI GOTODA, Department of Mechanical Engineering, Ritsumeikan University, KENG HOO CHUAH, Department of Mechanical Engineering, University of Kentucky, GENICHIRO KUSHIDA, Department of Mechanical Engineering, Aichi Institute of Technology — The buoyancy-induced oscillation is referred to as the so-called flame flickering and its dynamics are important when revealing mechanism of flame oscillations encountered in some combustion systems. Many aspects of flame oscillation / buoyancy coupling have been extensively explored, but the effect of swirling flow on buoyancy-induced flame flickering has yet to be elucidated. The purpose of the present study is to investigate how the buoyancy-induced flame flickering motion is altered by swirl, using a rotating Bunsen burner. The rotating burner tube (Diameter of the burner tube D_0 is 10 mm) is vertically supported by bearings, and rotated by a DC motor through a pulley and belt unit. The fuel injection velocity U (= volume flow rate / cross-sectional area of the burner tube) is varied from 0.1 to 0.3 m/s. The rotational speed of the burner tube N is varied up to 2000 rpm. Variations in the flame motion, oscillation frequency, and flame height as a function of burner rotation rate are presented in detail.

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