

# IDENTIFICATION OF DISCHARGE REGIMES OF CYCLONE DIPLEG-TRICKLE VALVE SYSTEM BASED ON PRESSURE FLUCTUATION PROFILES

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An experiment was conducted on the  $\Phi 150\text{mm} \times 5000\text{mm}$  cyclone dipleg-trickle valve setup, which was focused on analyzing the discharge characteristics of trickle valve of cyclone dipleg by means of the dynamic pressure measurement. The effects of two operating parameters, negative pressure drop ( $0 \sim 11\text{kPa}$ ) and solids flux rate ( $0 \sim 50\text{ kg/m}^2 \cdot \text{s}$ ), on the discharge patterns were investigated. The experimental results show that there are two kinds of discharge patterns in the trickle valve. One is continuous trickling discharge at low negative pressure drop and high solids flux rate, which is characterized by valve plate opening continuously, and the measured pressure with high frequency and low amplitude. The other is intermittent periodic dumping discharge at high negative pressure drop and low solids flux rate, which has the properties of valve plate opening interval, and the measured pressure with low frequency and high amplitude. The two discharge patterns could transform each other as varying the negative pressure drop or solids flux rate. The discharge regime map was proposed based on the experimental data, which is related to the negative

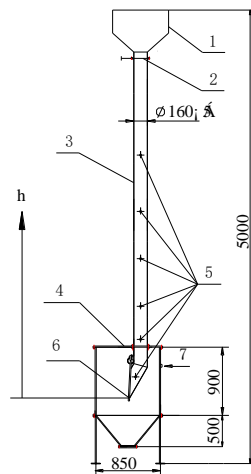


Fig. 1 Experimental setup

1—Bunker; 2—Butterfly valve; 3—Standpipe; 4—Gas tank; 5—Pressure measuring point;  
6—Trickle valve; 7—Pressured gas input point

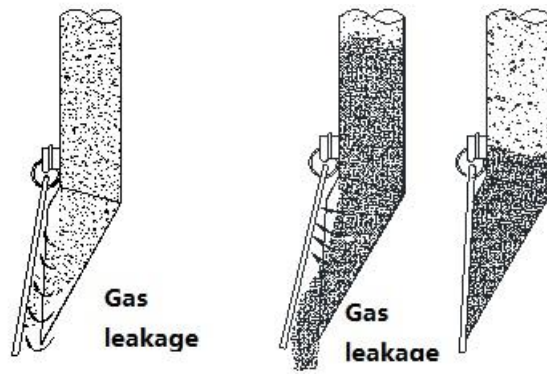
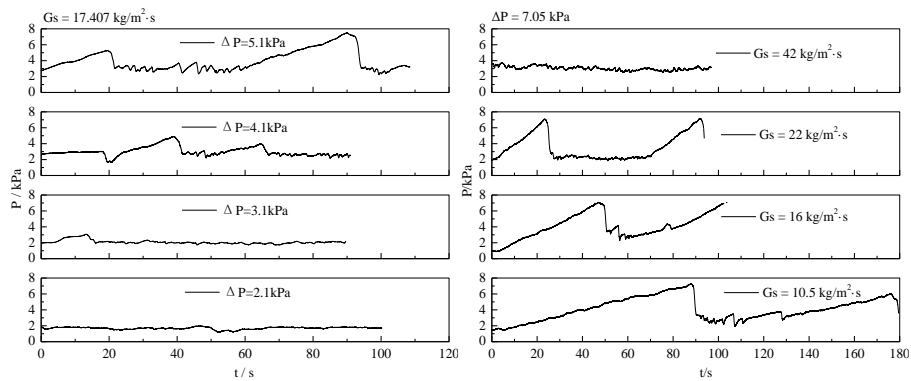


Fig.2 Diagrams of two kinds of discharge patterns of trickle valve

(a) Continuous trickling discharge (b) Intermittent periodic dumping discharge



(a)

(b)

Fig.3 Pressure fluctuation profiles at different negative pressure drop and solids flux rate (at the axial height:  $h=0.3$  m)

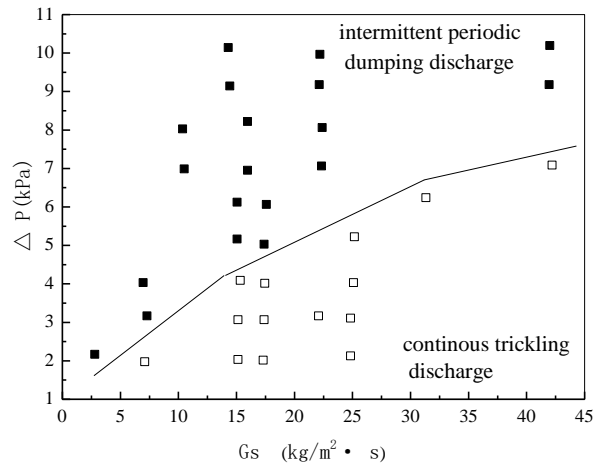


Fig.4 Discharge regime map of trickle valve