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Enhancement of the Impinging Diffusion Flame by Splash Plate

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It is clear that the potential core of the jet flow increases with the jet velocity. Similarity, the flame length of the jet flame also increases with jet velocity. Two opposing jets impinge together at an inclined angle, and form a mixing flow field illustrated in Fig. 1. During the impinging process, the jet flow velocities may decrease and attain a minimum at the impinging point. The momentum energy transfers to increase the flow intensities and mixing rate. Therefore, the combustion rates are accelerated as compared with a single jet flame. The research is focused on spreading out the flame stretch of the impinging flame by splash plate mechanism. Two types of the splash plate with flat plate and 60 degrees in sharp edge are conducted in this experiment. Slip condition occurs at the jet-to-jet impingement and no-slip condition takes place at the jet flow on the splash plate. A portion of the fluid energy will transfer to the radial direction by the no-slip condition. Therefore, it tends to overcome the flame stretch and spreads the impinging flame out. The fuel and air jets locate at opposite side, the result of the main reaction zone will concentrates at the fuel side. According to the distribution of the higher temperature region (above 1000°C), its combustion efficiency is higher than the results without the splash plate. The results of the splash plate with shape-edge indicate the fuel and the air entrain mutually. The higher temperature region spreads toward the air side.

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