

Design of LPG burner for hot air puffing machine

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■ **ABSTRACT** : In puffing machines the hot air is produced either by burning liquefied petroleum gas (LPG) or electric heaters to develop puffed ready-to-eat (RTE) product. In puffing machine the product is puffed in LPG flue gas mixed hot air based on the whirling bed principle. Therefore, to produce hot air by burning LPG, three non-premixed diffusion type burner configurations were designed to produce a stable blue flame with minimum soot length. In Type I burner of 20 cm length two concentric galvanized iron pipes- inner gas pipe of 2.7 cm (OD) and outer air pipe of 5 cm (OD) were used. The gas was introduced in the inner pipe of burner through copper pipe of 1.3 cm (OD) from outside. It works and produces the flame with an obstruction plate of diameter equal to inner burner pipe which was positioned in front of inner pipe for stability of flame. In experimental tests it was observed that flame do not catches when blower was started and forms a single jet unstable luminous (soot) flame at high air velocity. In Type II burner two steam pipes of diameter 4.7 and 2.7 cm (OD) were used for fabrication. In order to protect the flame from high velocity air, a truncated conical metal (cast iron) shield of 4.7 cm diameter was welded to the rim of air pipe. The Type II burner produced characteristic long blue flame and less soot length but there was soot formation in flame at relatively low air flow rates. To overcome the problem of flame instability and soot formation a third burner configuration was used. Three concentric steam pipes were used for Type III burner. It was observed that the secondary air from central pipe results in proper combustion, complete blue flame formation at the burner tip and better flame stability under variable air flow rates. In Type II and Type III burner, the flue gases of temperature ranging from 90° – 300° can be produced at gas flow rates from 7 – 22 lpm.

■ **KEY WORDS** : Burner, Flame stability, Blue flame, Combustion

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