Thesis Title	The Relationship Between Performance and Emission of LPG Cooking Stove
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Candidate	Miss. Somporn Tanatvanit
Supervisors	Assoc.Prof.Dr. Suvit Tia
	Asst.Prof. Warunee Tia
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Department	Energy Management
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Abstract

This thesis investigates the relationship between the performance and emission of 4 LPG cooking stoves: Conventional radial flow slotted burner (CB), Swirl flow central flame burner (NB), Radiant burner (RB) and Swirl flow central flame burner with swirl enhancement (SB). The Germany Standards (DIN EN 203-2 and DIN EN 203-1)were used in this study. It was found that the maximum thermal efficiency of SB type was 66.6%, and its value was the highest when compared to the conventional CB, NB and RB types, of which the values were 51.7%, 59.5% and 53.5%, respectively. This can be attributed to the swirl enhancement of SB burner. The swirling flame, as a result, can increase the residence time of impinging of hot flue gas onto the pot bottom and the effective heat transfer coefficient between them. Simultaneously, we measured the emission of CO_2, CO and NO_x from these LPG cooking stoves and the obtained concentrations were converted to Environmental Load Unit (ELU), which can be used for comparing the violent impact of these stoves to the environment. It was found that total emissions of SB type was lowest. It was $6.461*10^{-3}$ ELU/MJ of useful energy compared to $8.299*10^{-3}$, $7.220*10^{-3}$ and $8.263*10^{-3}$ ELU/MJ of useful energy obtained from CB, NB and RB types, respectively. This was due to the low consumption of fuel of SB type stove as the thermal efficiency increased.

The occupational and health aspect of these LPG cooking stoves were determined. When no ventilation, the kitchen was harmful whether any type of stove was continuously used due to the accumulated concentration of emissions, within a

short period, was over Permissible Exposure Level (PEL). Therefore, it was recommended that the kitchen be ventilated by using local or dilution ventilation.

Keywords : LPG cooking stove / Thermal efficiency / Emission / Combustion