Napumee Waitayapat 2012: Methane Reduction from DDF Engines under Low Load Conditions by Use of Electrical Heater Coupled to Catalytic Converter. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Assistant Professor Ekathai Wirojsakunchai, Ph.D. 132 pages.

In this research, an electrical heater system was chosen as a tool to increase the exhaust temperature of DDF's catalytic converter system in order to decrease methane. The advantage of this system is that the tool has low price, requires less area, and installs easily. The system was installed in The exhaust pipe system of the prototyped DDF engine, which was located before the entrance of the second catalytic converter (MAIN-CAT) for reducing methane gas. The temperature of exhaust, Lambda, the volume of Mass Flow Rate and percent of Energy Ratio are brought to the study to analyze the factors which can reduce methane gas from the electrical heater system.

The result showed that the electrical heater system car raise the temperature of exhaust, affecting catalytic converter do go to light-off temperature rapidly. This can reduce methane emissions from the DDF engine. Moreover, we found that not only the increasing temperature of exhaust before entrance to MAIN-CAT but also the characteristics of exhaust (the volume of oxygen in exhaust and chemical compositions of exhaust) were important factors of reducing methane gas. The result also showed that the exhaust mass flow rate and the level of CO emission have strongly affected the increasing temperature of exhaust and the efficiency of catalytic converter with proper exhaust conditions the electrical heater can raise the temperature of the exhaust before MAIN-CAT to 350 °C, and reduce methane gas more than 95%.

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