디젤엔진용 분절형 스틸 단조 피스톤의 주행성능 특성에 관한 실험적 연구

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An Experimental Study on Running Performance of Articulated Steel Forged Piston for Diesel Engine

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Key Words: Articulated Steel Forged Piston(분절형 스틸 단조 피스톤), CVS75 Mode(배출가스 시험모드)
Abstract : To meet the world's ever stringent environment regulation, the focus of current research on diesel engines are to reduce the size and to enhance the power of engine at the same time. Such requirement inherently increases the pressure of the combustion chamber. Under this high pressure, the operational pressure range of the current aluminum piston reaches about to the limit requiring a piston with higher operational pressure limit. The steel forged piston is under development as a potential replacement of the aluminum piston. In this study, in order to analyze the change of fuel consumption rate and exhaust gas characteristics due to weights and heat transfer characteristics difference between aluminum piston and steel forged piston, fuel consumption rate and exhaust gas characteristics are analyzed using chassis dynamometer. The characteristics of exhaust gas was analyzed through CVS75 mode experiment. Results indicate that the characteristics of exhaust gas of the articulated steel forged piston is similar to that of aluminum alloy piston.

부분 예혼합 압축착화엔진의 연소 해석

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Analysis of Combustion Phenomena in Partially Premixed Combustion Engine

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Key Words: Partially premixed combustion(부분예혼합연소), Flamelet combustion model(화염편 연소 모델), Soot(수트).

Abstract : In an HSDI Diesel engine, fuel can be injected to the combustion chamber earlier as a strategy to reduce NOx and soot emissions. However, in the case of early injection wall impingement can occur if the conventional spray angle and piston bowl shape are maintained. In this study, 3-D CFD simulation was used to modify the spray angle of the injector and the piston bowl shape so that wall impingement was minimized, and soot emissions were reduced. The wall impingement model was used to simulate the behavior of impinged droplets. In order to predict the performance and emissions of the engine, a flamelet combustion model with the kinetic chemical mechanism for NOx and soot was used. A reduction in soot emissions was achieved with the modification of the spray angle and piston bowl shape.