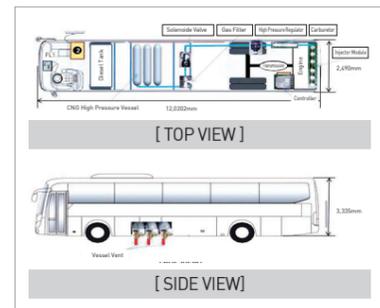


Technology for Dual Fuel (Diesel-Natural Gas) Engine with 425 PS

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⇒ Dual-fuel engine technology that uses diesel and compressed natural gas (CNG) fuel at modified conventional diesel engine for various purposes.



Client / Market

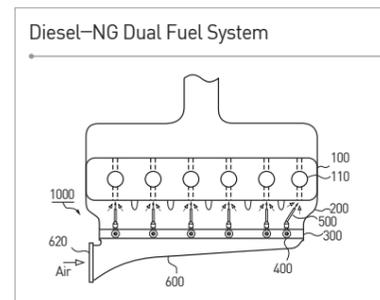
- Diesel-CNG dual-fuel car, diesel-CNG dual-fuel engine generator, special purpose machinery such as heavy equipment

Necessity of this Technology

- To overcome drawbacks of diesel engine, many studies on using clean low-carbon fuels has been done in diesel engines. In particular, for various environmental issues, the application of the diesel-gas fuel engine that combines the diesel fuel with low-carbon gas is being expanded.
- However, consumers may experience inconvenience due to the lack in number of CNG filling stations when fueling the engine through the natural gas fuel system,

Technical Differentiation

- The technology adds the CNG fuel supply and control apparatus to conventional fuel supply system in diesel engine to realize the dual fuel combustion. Due to high replacement ratio of CNG fuel to diesel fuel, approximately 10 million won can be saved in fuel cost after 1-year operation. Even when all CNG fuel has been exhausted, the system automatically switches to use diesel fuel only that engine can be operated in normal even in the shortage of CNG fuel,
- The reduction in fuel cost can be obtained when realizing high gas fuel replacement ratio, which is achieved with the multi point injection (MPI) and the precise fuel injection control technology that supplies and distributes gas fuel to each combustion chamber of the engine.
- Dual fuel engine that realizing simultaneous combustion of diesel fuel and CNG fuel can reduce exhaust gas emission, while maintaining engine performance. Over 20% of CO₂ emissions, a greenhouse gas, can be reduced.
- We already obtained modifying technology for up-to-date diesel-CNG dual fuel vehicle, that is, localized technology for CNG fuel supply system, engine remodeling and ECU production technology for various vehicles. Also, the development period for a new vehicle is very short by using the mapping data and precision control algorithm that is already obtained from the dual fuel engine experiment



DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

Other



TECHNOLOGY READINESS LEVEL [TRL]



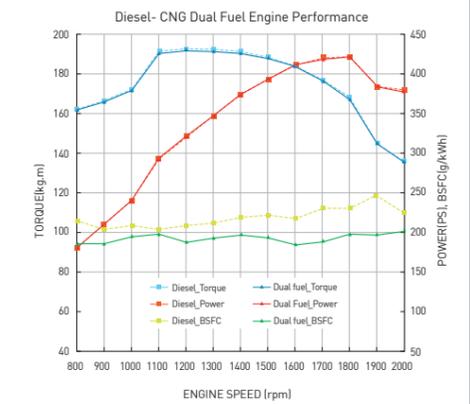
Excellence of Technology

- An electronic control system and CNG fuel supply system considers the characteristics of CNG fuel are developed for same time combustion of diesel and CNG fuel.
- Fuel replacement ratio: Over 70%
- Fuel cost reduction rate: Over 30% (compared to diesel fuel consumption)
- Maximum engine output: 425/1800 (ps/rpm) (same as for a diesel engine) Satisfies EURO-5, 6 for gas emission standard

Result of 2,000km Driving Test with CNG Dual Fuel Bus (D6CB)

Category	Unit price	Use	Objective level	Price (won)	Fuel efficiency
Diesel vehicle	Diesel	1,800/L	606 L	1,090,800	3.3 km/L
	Diesel	1,800/L	232 L	417,600	8.6 km/L
Dual fuel vehicle	CNG	943/Nm ³	392 kg	369,656	5.1 km/kg
	CNG dual fuel expenses			787,256	= 150원 /km
	Diesel vehicle-Dual fuel vehicle			303,544	
Annual saving	For 80,000 km mileage = 12,000,000				

Dual Fuel Engine Performance Result



Current Intellectual Property Right Status

PATENT

- Temperature Control System for Natural Gas Which is Applied to Heterogeneous Fuel Engine (KR2014-0111307)
- Fuel Supply Apparatus for Diesel Gas Dual Fuel Engine (KR1471167)
- Fuel Supply Apparatus for Dual Fuel Diesel Engine with Mechanical Fuel Pump (KR1398096)