

Engines cold starting (cranking) in low environmental temperatures is considered a serious problem, especially for sub-zero degrees. This is due to the condensation of the liquid fuel, the loss of ignition energy, the narrow of flammability limit of gasoline, and long residence time. Generally, to achieve better engine startability, more fuel has to be injected which leads to further increase in hydrocarbon engine tail pipe emissions. The present study was carried out using an E6 Ricardo variable compression ratio single cylinder engine. A freezing chamber (up to -110°C) was built. The current study investigates experimentally the influence of using gaseous fuel during cold cranking process instead of gasoline fuel. A comparative study has been carried out for different gaseous fuels (Propane + Butane blend, Natural Gas, and Hydrogen) relative to the liquid gasoline fuel at different engine starting environmental temperatures. The results showed that the use of gaseous fuels prevail a substantial reduction in the number of cranking before engine starting during low temperatures than that of gasoline. It was also found that the hydrogen is superior than other examined gaseous fuels. The small amount of gas fuel makes the system feasible for practical use and cost however the extra cost for the safety can be an issue in addition to the more complex control.