

Performance of an Automotive Engine Running on Gasoline-Condensate Blends

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Abstract : Significantly lower cost, bulk availability, absence of identification color additives and relative ease of mixing with fuels have made gas-field condensates a lucrative option as adulterant for gasoline in Bangladesh. Widespread adulteration of fuels with gas-field condensates being a problem existing mainly in developing countries like Bangladesh, Nigeria etc., research works regarding the effect of such fuel adulteration are very limited. Since the properties of the gas-field condensate vary widely depending on geographical location, studies need to be based on local condensate feeds. This study quantitatively evaluates the effects of blending of gas-field condensates with gasoline(octane) in terms of - fuel properties, engine performance and exhaust emission. Condensate samples collected from Kailashtila gas field were blended with octane, ranging from 30% to 75% by volume. However for blends with above 60% condensate, cold starting of engine became difficult. Investigation revealed that the condensate samples had significantly higher distillation temperatures compared to octane, but were not far different in terms of heating value and carbon residues. Engine tests showed Kailashtila blends performing quite similar to octane in terms of power and thermal efficiency. No noticeable knocking was observed from in-cylinder pressure traces. For all the gasoline-condensate blends the test engine ran with relatively leaner air-fuel mixture delivering slightly lower CO emissions but HC and NOx emissions were similar to octane. Road trials of a test vehicle in real traffic condition and on a standard gradient using 50%(v/v) gasoline-condensate blend were also carried out. The test vehicle did not exhibit any noticeable difference in drivability compared to octane.

Keywords : condensates, engine performance, fuel adulteration, gasoline-condensate blends

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