



Fig 15 Engine torque – NOx emission chart

4. Conclusion

1. Using ethanol and ethanol-isobutanol as a fuel additive to unleaded gasoline causes an improvement in engine performance and exhaust emissions.
2. Both Ethanol addition and Ethanol- isobutanol addition to gasoline results in an increase in brake power, brake thermal efficiency, volumetric efficiency, and fuel consumption respectively. But addition of 5% isobutanol and 10% ethanol to gasoline increases about 6.2%, 8.2%, 7.8% and 6.7% mean average values respectively. In addition, the brake specific fuel consumption decreases by about 3.4% mean average value.
3. Using ethanol and isobutanol to unleaded gasoline blend leads to a significant reduction in exhaust emissions by about 36.5% and 34.3% of the mean average values of CO and HC emission respectively for all engine torque, on the other hand NOx emissions increases for all engine torque values. But ethanol and gasoline fuel blends gives least reduction in HC and CO emission and significant increase in NOx emission for all engine torque values compared to ethanol and isobutanol fuel blends. 5% of butanol and 10% ethanol addition to gasoline gave the best emission control among all fuel blends.
4. The addition of 10% ethanol and 7.5% isobutanol to the unleaded gasoline is achieved on our experiments without any problems during engine operation.

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