ITS Testing Services (U.K.) Ltd. – Shj. Br.

Vehicle Emissions Monitoring
Report No.AE 13118266

The above mentioned analysis is carried out by ITS - Caleb Brett Laboratories, unless marked as witnessed (* *)

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Report No : AE 13118266 : SHRJ 4866 / 13

Analysis Procedure

Scope

Test Description:

Emissions monitoring of O_2, CO, CO_2, NO_x, NO_2, SO_2, and CH_4.

Intertek will use MRU Vario Plus SE to monitor levels of O_2, CO, CO_2, NO, NO_2, SO_2, and CH_4. in stack emissions. MRU Vario Plus SE is a combination of electrochemical cell and NDIR (Non Dispersive Infrared) analyzer to monitor emissions level. The emission monitoring technique complies with the US EPA CTM 030 and CTM 034. Gas concentrations are logged as often as every minute onto a laptop PC and real-time concentration charts can be generated if required. Test duration is 30 minutes per run. There will be 2 - 4 runs that will be performed.

No.	Details.
1	Emissions monitoring of O_2, CO, CO_2, NO_x, NO_2, SO_2, and CH_4.

Test Procedure

1. Fuel Ox to provide a fully operational diesel truck at Intertek sharjah premises with driver and mechanic.

2. Drain the balance existing fuel from the fuel tank and fill full tank(auto click of the nozzle) normal grade diesel fuel from the opposite adnoc pump.
   a. Record the qty of fuel filled full tank
   b. Record the odometer reading
   c. Intertek to seal the diesel tank

3. Run the truck to Ras Al Khaima and back to Intretek Sharjah through the planned route

4. Run 1-on return to Intertek,conduct the first run of pollution test as per Intertek Test method.

5. Record the odometer reading on completion

6. Take the van to the opposite same fuel pump. Fill same grade diesel full tank
   a. Record the quantity of fuel filled to fill the tank(autoclick of the nozzle)

7. Based on the qty of the fuel, in the full tank, Intertek to add Fuel Ox additive at 1: 5000 ratio in the vehicle tank

8. Run the truck for 100 kms(this is for cleansing the old soot deposited in the engine)

9. On return to Intretek sharjah , take the van to the opposite same fuel pump.

10. Drain the fuel tank

11. Fill same grade diesel full tank from same machine
    a. Record the quantity of fuel filled to fill the tank(autoclick of the nozzle)
    b. Record the odometer reading
    c. Add Fuel Ox additive at 1:10000 ratio to the fuel tank based on the qty in the full tank
    d. Intertek to seal the diesel tank

12. Run the truck to Ras AL Khaima and back through the same planned route

13. Run 2-on return to Intertek Sharjah conduct the second run of pollution test as per Intertek method.

14. Record the odometer reading on completion

15. Tests completed. Compare run 1 results for pollution and mileage and run2 results for pollution and mileage

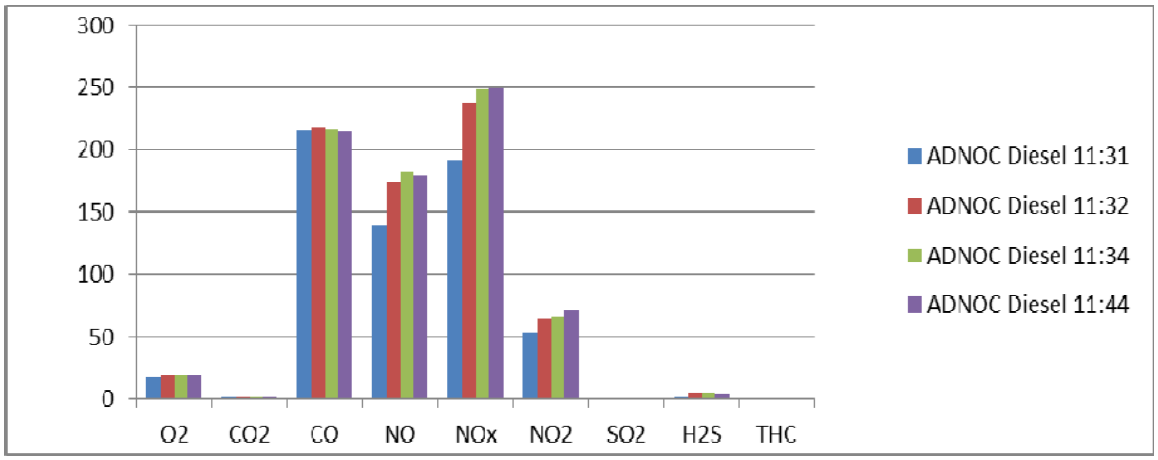
Analysis Results

A)- Initial Run – Before Adding the Additives :

Vehicle Type	Mitsubishi Canter – 2013 Model Pickup Plate : 97977 – TRP2 - Abu Dhabi Fuel Tank Capacity : 100 Liter Fuel In Use : Adnoc Green Diesel
Initial Odometer Reading (After filling 100 Ltrs)	3248 KM.
Fuel Tank Volume	100 Liter
Vehicle Tank Sealed	Sticker Seal No : 008154 & 008155 Intertek Seal no 447310
Final Odometer Reading	3399 KM
Distance Travelled	151 KM.
Fuel Tank Topped Up Volume	17.610 Liter

Readings :Table 1

Fuel Type	**ADNOC Diesel**			
Time	**11:31 – 1st Run**	**11:32 – 2nd Run**	**11:34 – 3rd Run**	**11:44 – 4th Run**
O_2 (%)	18.1	18.23	18.23	18.24
CO_2 (%)	2	1.9	2	1.9
CO (ppm)	216	218	217	215
NO (ppm)	139	174	182	179
NO_x (ppm)	192	238	249	250
NO_2 (ppm)	54	64	66	71
SO_2 (ppm)	0	0	0	0
H_2S (ppm)	2	5	5	4
THC (ppm)	0	0	0	0



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B)- Final Run – After Adding the Additives Fuel Ox :

Vehicle Type	Mitsubishi Canter – 2013 Model Pickup Plate : 97977 – TRP2 - Abu Dhabi Fuel Tank Capacity : 100 Liter Fuel In Use : Adnoc Green Diesel
Initial Odometer Reading (After filling 100 Ltrs & 10 ml Additive)	3476 KM.
Fuel Tank Volume	100 Liter
Vehicle Tank Sealed	Sticker Seal No : 008150 & 008151 Intertek Seal no 447337
Final Odometer Reading	3627 KM
Distance Travelled	151 KM.
Tank Topped Up Volume	13.620 Liter

Readings :Table 2

Fuel Type	**ADNOC Diesel with Fuel Ox Additive (10 ml)**			
Time	**17:00 – 1st Run**	**17:05 – 2nd Run**	**17:06 – 3rd Run**	**17:07 - 4 th Run**
O_2 (%)	18.72	18.63	18.61	18.6
CO_2 (%)	1.6	1.4	1.6	1.6
CO (ppm)	210	216	244	227
NO (ppm)	146	146	149	150
NO_x (ppm)	213	215	220	222
NO_2 (ppm)	67	69	71	72
SO_2 (ppm)	0	0	0	0
H_2S (ppm)	4	4	3	3
THC (ppm)	0	0	0	0

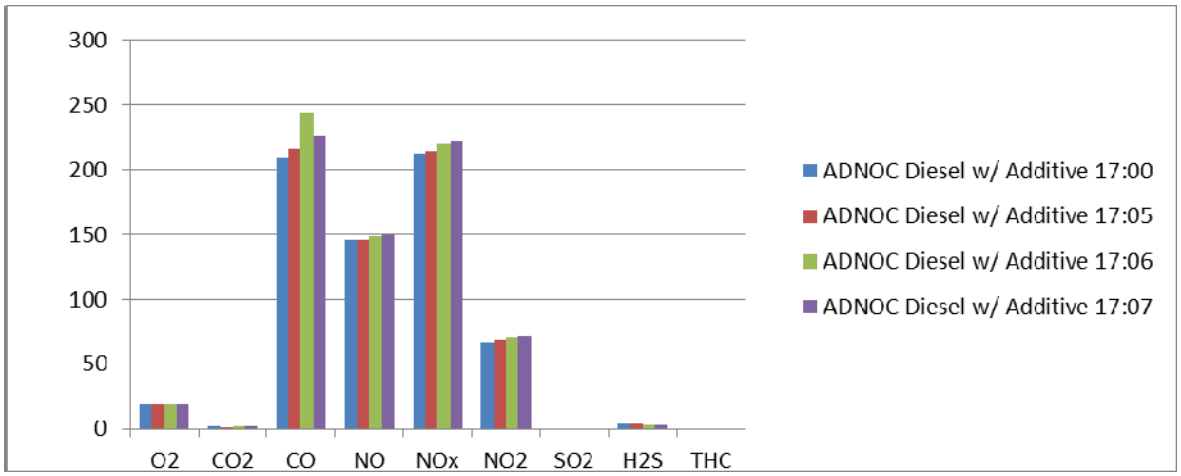

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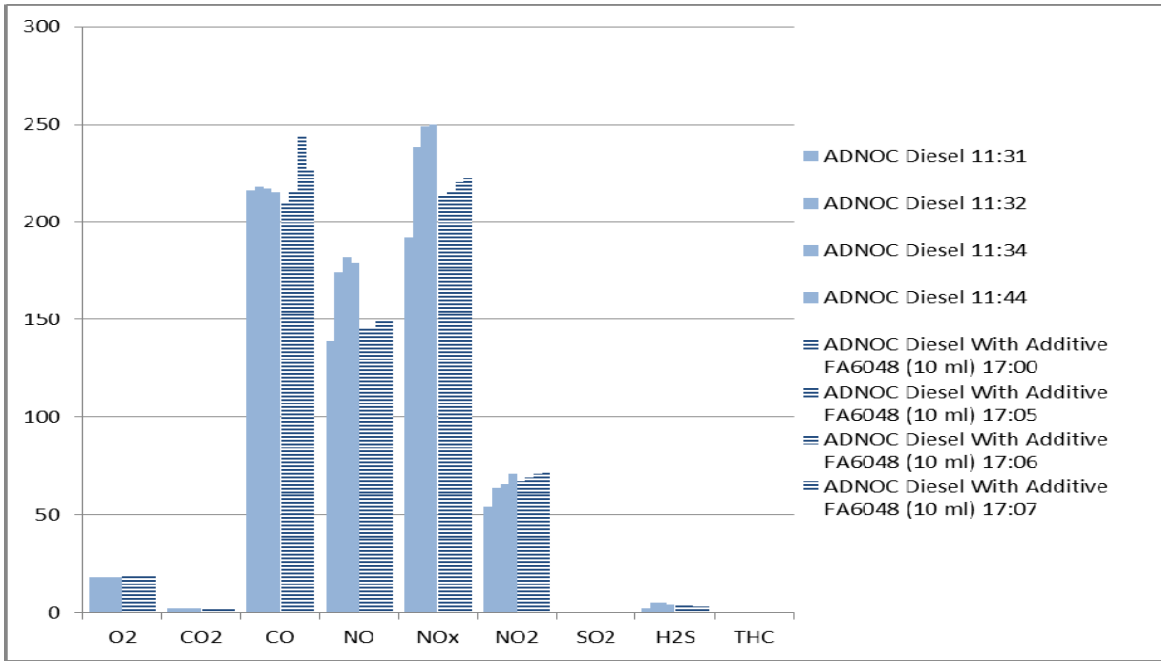
Table 3

Summary of Vehicle Emissions Analysis Result (05/12/2013)											
Fuel Type	**ADNOC Diesel**				**ADNOC Diesel With Additive**				**Average reading (ADNOC Diesel)**	**Average reading (ADNOC Diesel With Additive)**	**(%) Difference**
Time	11:31	11:32	11:34	11:44	17:00	17:05	17:06	17:07			
O_2	18.1	18.23	18.23	18.24	18.72	18.63	18.61	18.6	18.2	18.64	2.41
CO_2	2	1.9	2	1.9	1.6	1.4	1.6	1.6	1.95	1.55	-20.51
CO	216	218	217	215	210	216	244	227	216.5	224.25	3.57
NO	139	174	182	179	146	146	149	150	168.5	147.75	-12.31
NO_x	192	238	249	250	213	215	220	222	232.25	217.5	-6.35
NO_2	54	64	66	71	67	69	71	72	63.75	69.75	9.41
SO_2	0	0	0	0	0	0	0	0	0	0	0
H_2S	2	5	5	4	4	4	3	3	4	3.5	-12.5
THC	0	0	0	0	0	0	0	0	0	0	0



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Observation & Conclusion:

This study was conducted to know the effect of Fuel Ox additive on Vehicle Gas Emission. After gathering and comparing the results taken from the test runs, we have observed the positive effect of the Fuel Ox additives on the gas emission as detailed below. Please refer Table 3 above for the full list.

Type of Gas Emission	Effect
O2	Increased by 2.4%
CO2	Reduced by 20%
NO	Reduced by 12.3%
NOX	Reduced by 6.3%
H2S	Reduced by 12.5%

Additionally based on the fuel usage for the test run we have observed that there is an increase in the mileage of the vehicle which would further reduce emissions due to less fuel being used for the same distance.

Reported by

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