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Dee-Zol and ATX-950 – Emissions and Mileage Testing 2001

In response to customer inquiries regarding the effects and benefits of Bell Performance products, testing was initiated to document the effects of two diesel additives – Dee-Zol and ATX-950 – on fuel consumption and emissions.

Test protocols were contracted to be performed at an ISO-9002-certified laboratory in Quebec, Canada; a registered facility experienced in the testing of fuels and fuel additive applications.

Testing commenced on June 11, 2001. A baseline period of data was established over 10.5 hours of engine operation. This was followed by Pre-conditioning and Performance engine batteries where fuel consumption and emissions were measured while fuel treated with Dee-Zol and ATX-950 was tested. A Pre-conditioning phase using a double-dose of Dee-Zol was executed in order to complete cleaning of excess carbon deposits from within the engine which otherwise would abnormally skew results – if excess unburned carbon deposits are present within an engine upon introduction of the additive, the additive will remove said deposits into the combustion chamber where they will participate in combustion. Said deposits have a lower heating value than diesel fuel, which results in a temporary reduction of fuel efficiency gain or even a rise in fuel consumption until the carbon deposits are removed at the cessation of the Pre-conditioning phase.

On June 26th a second baseline was established after installation of new injectors, and Performance batteries were run to measure comparative fuel consumption when fuel was treated with ATX-950. On July 6th a third baseline was established after installation of a new cylinder head, and a third Performance battery was executed to measure comparative fuel consumption with treated fuel (#2 diesel plus ATX-950). Varying treatment ratios were used to establish comparative results.

Test engine model SCRE-251 was used, a diesel engine rated at 250 hp. #2 diesel fuel with a heating value of 45244 kJ/kg and specific gravity of 0.842 was used. Engine-specific factors such as engine speed and load were controlled during all phases of testing, as well as environmental factors such as air temperature, pressure and relative humidity. The controlling of such factors is standard practice in comparison testing such as this.

Results

Full data is listed in the table below. The summary of results were as follows:

- Single-dose (1:1280) treatment with Dee-Zol reduced fuel consumption from 1.495 (g/KW-hr) to 1.477, a reduction of 1.2%.



- Single-dose treatment with Dee-Zol reduced CO emissions from 3.495 (g/hp-hr) to 2.89, a reduction of 17.3%
- Single-dose treatment with Dee-Zol reduced NOx emissions from 11.2 (g/hp-hr) to 10.5, a reduction of 6.25%.
- Variable-dose treatment with ATX-950 ranging from 1:2000 to 1:6000 reduced fuel consumption on the second and third baseline-performance runs by 1.0% and below. It can be inferred from these results that ATX-950 has a greater effect on heavier fuel oils such as #6 than it does on a lighter fuel like #2 diesel. It can also be inferred that the effect within compressions ignition engines may be lesser than the product's effect within a boiler unit.

Phase	Product Treat Ratio	Test Dates/Times	Test Hours	Total Engine Hours	Fuel Consumption (g/kW-hr)	Emissions CO (g/hp-hr)	Emissions NOx (g/hp-hr)
Baseline		6/11 15:00 to 6/12 18:30	10.5	10.5	1.495	3.495	11.2
Preconditioning	DZL Double Dose	6/12 18:30 to 6/13 20:30	8	18.5	1.489	2.89	11.2
	DZL Double Dose	6/13 20:30 to 6/18 23:00	23.5	42	1.484	2.91	10.6
Performance	DZL Double Dose	6/18 23:00 to 6/21 01:00	10	52	1.477	2.89	10.5
	DZL Single Dose	6/21 01:00 to 6/22 18:00	10	61	1.479		
	ATX-950 1:2000	6/22 18:00 to 6/26 23:30	4	65	1.498		
Baseline #2	New Injector	6/26 23:30 to 6/27 18:00	3.5	68.5	1.492	2.65	10.8
Performance	ATX-950 1:2000	6/27 18:00 to 6/27 21:00	2.5	71	1.498		
	ATX-950 1:4000	6/27 21:00 to 6/29 20:00	12.5	83.5	1.477		
	ATX-950 1:5000	6/29 20:00 to 7/3 21:00	8.5	92	1.478		
	ATX-950 1:6000	7/3 21:00 to 7/4 00:30	4	96	1.483		
Baseline #3	New Cylinder Head	7/6 18:00 to 7/6 22:00	3.5	99.5	1.474		
Performance	ATX-950 1:4000	7/6 22:00 to 7/10 16:30	13	112.5	1.471		
	ATX-950 1:5000	7/10 16:30 to 7/12 10:30	7	119.5	1.466		
	ATX-950 1:6000	7/12 10:30 to 7/17 14:00	10	129.5	1.465		