EMISSION REDUCTION TRIAL 2001/02

TRIAL OF FITCH FUEL CATALYST IN A VAUXHALL VECTRA PETROL ENGINE

Test Period	May 2002 – August 2002
Subject Vehicles	Vauxhall Vectra
Year of Manufacture	1997/98
Engine Capacity	2.0 litres
Fuel System	Injection
Device Applied	**Fitch Fuel Catalyst**
Device Supplier	Savtech
Device Cost	£86 + fitting (approx 30 minutes)

1. **Trial Rationale:**

The City of York Council has made commitments under both a Local Agenda 21 Plan and the Aalborg Charter to attempt to reduce the environmental impact of road traffic within the City. The present Energy Saving Trust Powershift incentive to adapt vehicles to 'alternative fuels' such as LPG is not available to owners of many vehicles, and many inefficient and polluting vehicles are excluded from assistance.

The City of York Council Emission Reduction Trial 2001/02 aims to provide local, independent information to the owners of excluded vehicles to enable them to evaluate the benefits of fitting low cost devices, which claim to save fuel and reduce exhaust emissions.

2. **Trial Description:**

The trial subject is a two litre, Vauxhall Vectra with a manual gearbox; this is an extremely popular vehicle in both private and fleet ownership. Prior to fitting, the vehicle was tested for exhaust HC, CO, CO_2, NO_x and O_2; results are shown in Section 8 below. Six Fitch catalyst 'drop ins' were inserted into the fuel tank via a filler pipe connection under the vehicle. After running for approximately ten minutes, the exhaust emissions were tested again and results noted; these results are also shown at Section 8. The vehicle returned to daily use as a family car for a period of 12 weeks, during which time 4200 miles were travelled; further exhaust gas testing was carried out by the Harrogate Borough Council MOT testing station (VTS 37958) at the end of this period. Fuel consumption data prior to and during the trial was collected and is shown in Section 9 below.

3. Device Description:

The Fitch fuel catalyst is available in two forms, a unit that is fitted to the fuel line to the engine, and as 'drop in' units, which are placed directly into the fuel tank. In this test 'drop ins' were used in order to avoid disturbing the manufacturer's hose connections. Each fitting has a lifespan of 250,000 miles, requires no maintenance and is applicable to petrol and diesel fuels.

The device is said to operate through catalytic modification of the fuel to alter the length of hydrocarbon molecule chains, which in turn provides a more even and complete burn, thus reducing emissions.

4. System Drawbacks:

The 'drop ins' are, in practice, not retrievable without significant effort, as they are free to move around the floor of the fuel tank. In this test, the fuel filler pipe had a flattened section through which the 'drop ins' would have to pass, which combined with the length of the filler pipe, required the units to be inserted through a filler pipe connector under the vehicle. Where anti-siphon barriers are within the fuel filler pipe this procedure will also be necessary. These problems can be avoided by the use of the in-line system at an additional cost.

5. Potential Data Inaccuracies:

The collection of fuel data always carries the hazard of data inaccuracies; human error is the most likely cause as there is a need to transcribe information. All analysis is based upon the raw data to avoid inaccuracies caused by taking the average of a set of averages. Varying traffic and driving conditions have noticeable effects on fuel efficiency and individual spikes or dips in performance should be considered within this context. There is limited fuel data prior to fitting and further data would have better established a base line figure for consumption.

Emissions testing also carries the potential for inaccuracies to occur; in this trial two testing stations were used which may have given rise to a degree of variation in results.

At the time of fitting, the vehicle was found to have an exhaust leak; this was rectified prior to the 4-month test but this remedial work did not include the replacement of the catalytic converter.

6. Summary of Results:

During the trial emissions of the gasses measured were reduced significantly. Notably, hydrocarbons in the exhaust stream were reduced by 90% whilst Carbon Monoxide was reduced to zero and Carbon Dioxide reduced by 15%. Oxides of Nitrogen were reduced by 32%.

Average fuel consumption can be seen to be improved by 6.13% following the fitting of the device and the elapse of a 'conditioning' period.

7. Test Conclusions:

The conclusions of this trial are that the Fitch Fuel Catalyst significantly reduced the exhaust emissions of the test vehicle. The oxides of Nitrogen air quality pollutants were reduced, whilst emissions of Carbon Monoxide were effectively eliminated. The emission of unburned fuel was also dramatically reduced. The vehicle received no maintenance during the trial except for the exhaust leak repair, and emission reductions of this magnitude can be credited only to the Fitch Fuel Catalyst.

Fuel savings were made which may have been influenced by many factors including the Fitch device, however the reduced emission of unburned fuel suggests more complete and efficient combustion.

8. Emissions Dataset:

Idle						
	HC ppm	**% CO**	% CO_2	**NOx ppm**	**% O_2**	
Idle Before	118	1.3	12.26	75	4.69	
Idle After	76	0.1	11.26	33	4.87	
Immediate Improvement	35.59%	92.31%	8.16%	56.00%	-3.84%	
Idle 4 Months	Not tested	0.00	Not tested	Not tested	Not tested	
Additional Improvement	-	7.69%	-	-	-	On base line
Total Improvement	**35.59%**	**100.00%**	**8.16%**	**56.00%**	**-3.84%**	On base line

2500 rpm						
	HC ppm	**% CO**	% CO_2	**NOx ppm**	**% O_2**	
MOT Test Requirement	<200	<0.50				
2500 rpm Before	98	1.2	14.25	287	4.69	
2500 rpm After	25	0.1	12.12	195	4.82	
Immediate Improvement	74.49%	91.67%	14.95%	32.06%	-2.77%	
2500 rpm 4 Months	9	0.00	Not tested	Not tested	1.03	
Additional Improvement	16.33%	8.33%	-	-	80.81%	On base line
Total Improvement	**90.82%**	**100.00%**	**14.95%**	**32.06%**	**80.81%**	On base line

9. Fuel Dataset:

Date	Distance	Fuel (Ltrs)	Gallons	Total Fuel	Post fit fuel	Total Miles	Post fit miles	MPG	Pre Fit Running Av. Mpg	Post Fit Running Av. Mpg
14/04/2002	78	12.76	2.81	2.81		78		27.75	**27.75**	

17/04/2002	210	32.62	7.19	10.00		288		29.23	**28.81**	
21/04/2002	269	37.00	8.15	18.15		557		33.01	**30.70**	
25/04/2002	273	40.59	8.94	27.09		830		30.54	**30.64**	
16/05/2002	322	46.01	13.11	40.20		1152		24.56	**28.66**	Fitch Fitted
19/05/2002	333	40.93	9.02	49.21	9.02	1485	333	36.94		36.94
26/05/2002	361	48.72	10.73	59.94	19.75	1846	694	33.64		35.15
15/06/2002	311	49.38	10.88	70.82	30.62	2157	1005	28.59		32.82
24/06/2002	287	40.05	8.82	79.64	39.44	2444	1292	32.53		32.75
03/07/2002	217	40.05	8.82	88.46	48.27	2661	1509	24.60		31.26
Aug-2002	201	27	5.95	94.41	54.21	2862	1710	33.80		31.54
Aug-2002	229	39.01	8.59	103.00	62.81	3091	1939	26.65		30.87
Aug-2002	134	24.78	5.46	108.46	68.26	3225	2073	24.55		30.37
Aug-2002	251	41	9.03	117.49	77.30	3476	2324	27.79		30.07
Aug-2002	176	28	6.17	123.66	83.46	3652	2500	28.54		29.95
Aug-2002	308	40	8.81	132.47	92.27	3960	2808	34.96		30.43
Aug-2002	226	30	6.61	139.08	98.88	4186	3034	34.20		30.68
Aug-2002	143	21.51	4.74	143.81	103.62	4329	3177	30.18		30.66
Aug-2002	260	43.5	9.58	153.40	113.20	4589	3437	27.14		30.36
Aug-2002	195	33	7.27	160.67	120.47	4784	3632	26.83		30.15
Aug-2002	280	37	8.15	168.81	128.62	5064	3912	34.36		30.42

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