REPORT
on the
INSTALLATION and TESTING
of
THE FUEL CAT/ ECS SYSTEM
on Vehicles
for the

Sharjah Police Department
Dubai Police Department
Dubai Municipality

UAE April 1995

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EXECUTIVE SUMMARY

Thirteen vehicles were arranged for these trials out of which four were unavailable to us (listed as **B**, **C**, **E** and **F** later).

The vehicles fitted with the ECS system on this visit were allocated numbers (e.g. ④) - those not fitted were given letters (e.g. **C**).

Of those available, tests were not possible on two of them (labelled ⑦ and **D**).

Vehicle **A** was damaged by mechanics in the garage and could not be used for testing.

This left six vehicles for the programme.

Vehicle ① suffered from oil contamination as the oil and filter were not changed when requested which nullified the results.

Vehicle ⑤ was allowed to commence the test sequence with its fuel system wrongly set (ECS fault) and a road traffic accident involving this vehicle precluded its inclusion in the test.

The remaining four vehicles all produced results as forecast, despite the unusually short distances driven after fitting the ECS system.

Results Summary

Vehicle ID	Carbon Monoxide Reduction	Hydrocarbon Reduction	Smoke Reduction
①	20%	26.1%	not applicable- petrol
②	not applicable- diesel	not applicable- diesel	44.8%
③	28.1%	41.1%	not applicable- petrol
⑥	55.3%	27.9%	not applicable petrol

These figures will all improve even more as the vehicles are driven further

ECS were grateful to receive the kind invitation to visit Dubai once again and there demonstrate our product to the three new authorities who had expressed an interest in the system since our last visit in January.

In particular we would like to directly thank the officers named below who assisted us in our work.

Purpose

This demonstration was to doubly confirm the previous test results to the three authorities on a more varied selection of vehicles which would once again illustrate the system's benefits in reducing poisonous vehicle emissions and thereby contributing directly to cleaner air and better health for the Nation.

The associated fuel savings and power increases were not the prime purpose of this demonstration.

Diesel or Petrol fuels

During our last visit we concentrated exclusively on diesel-fuelled vehicles on which it was simple to prove the effectiveness of the system.

On this trip, now having the proper test equipment, the remit was extended to include petrol (gasoline) powered units.

The tests on both petrol and diesel units were conducted with the very latest specialised emission testing equipment, built and calibrated to the relevant European Standards.

The test equipment was operated by Mr. Alan Lambert of International Business Ventures who has recently completed an official operator's course on these equipments at the manufacturer's training facility in England.

Legislation

It is our understanding that there is currently no legislation directly covering the control of exhaust pollutants from petrol or diesel engines in the United Arab Emirates.

These poisons are thus constantly pumped into the atmosphere without control.

a matter for each relevant authority, we merely asked for a good spread of engine sizes and types. The selected units were such as to give a good mix of manufacturers, types, engine capacities, usage profiles and the range of emissions expected.

These were used to demonstrate the immediate benefits of the ECS system in the short time available.

We normally recommend that the equivalent of at least 800 kilometres be driven before comparison tests are performed. The system is expected to achieve maximum effectiveness at about 5000 kilometres. Life thereafter is normally some 150,000 kilometres.

Further improvements which will occur after the necessarily brief test period are not part of this initial report.

The vehicles arranged were:

The Sharjah Police Department

① ..... **Toyota Corolla 1.6 SE**	**number 46261**
② ..... **Daihatsu Delta Diesel Light Truck**	**number 46785**

The Dubai Police Department

③ ..... **Bedford 4-Tonne truck**	**number 50538**
④ ..... **Daihatsu Mini-Bus (3.6 litre)**	**number 50934**
⑤ ..... **Mercedes Series 300 Patrol Car**	**number 50203**
A ..... Land Rover damaged in garage	*(beyond use for test)*

The Dubai Municipality

⑥ .... **Daihatsu Rocky (1.5 litre)**	**number 83814**
⑦ ..... RABA Diesel Truck (250/300 BHP)	*(not moved-not tested)*
B ..... Volvo B10M Municipal Bus	*(not available)*
C ..... DAF Refuse Compactor Truck	*(not available)*

Central Military Command

D ..... IVECO Recovery Vehicle	*(unable to test)*
E ..... Bedford Truck	*(not available)*
F ..... Mercedes Tanker	*(not available)*

Test Results

The Sharjah Police Department

Liaison Officer - Engineer Samy Maharram

① ***Toyota Corolla 1.6 SE*** ***number 46261***

Date	Test	kilometres	RPM	Temp.	CO	HC	CHANGE CO	CHANGE HC
April 13	1	13,555	----	89 deg C	1.3 %	415.6ppm	-------	------
April 17	2	13,568	----	85 deg C	1.04 %	307 ppm	**-20%**	**-26.1%**

Observations

The CO readings during test 2 were erratic, possibly due to the power surges as the electric fan and air conditioning unit cut in.

We recommend that the vehicle be run for 800 kilometres to achieve stable readings and are confident that the emissions will continue to fall.

② ***Daihatsu Delta Diesel Light Truck*** ***number 46785***

Date	Test	kilometres	distance covered	SMOKE	CHANGES
April 13	1	20,786	----------	1.25	------
April 17	2	20,900	114	0.69	**-44.8%**

Observations

When 800 kilometres have been covered (*and before 1,000 kilometres*) change engine oil and fuel & oil filters.

The improvements will continue.

The Dubai Police Department

Liaison Officer - First Lieutenant Humaid Mohd. Al-Ansari

③ ***Bedford 4-Tonne truck*** ***number 50538***

Date	Test	kilometres	RPM	Temp.	CO	HC	CHANGES CO	CHANGES HC
April 12	1	42012	767	64 deg C	5.88%	595.0ppm	-------	------
April 16	2	42032	708	69 deg C	4.23%	350.7ppm	**-28.0%**	**-41%**
April 19	3	42,275	**508**	70 deg C	4.42%	433.4ppm	**-24.8%**	**-27%**

Observations

Readings from the test number 3 performed on April 19th would have continued to improve over the test 2 figures but for the fact that the test was performed at a slower engine speed than before which has the effect of imposing a slightly richer burn on the engine.

Approximately the same RPM as before should have been used to produce a proper comparison.

It is obvious that the improvement continues - change oil and filter after 800 km.

④ ***Daihatsu Mini-Bus (3.6 litre)*** ***number 50934***

Date	Test	kilometres	distance covered	SMOKE	CHANGE
April 12	1	67096	----------	3.42	------
April 12	2	67148	52	4.91	+43.6%
April 16	3	68108	1012	4.24	+23.9%
April 19	4	68891	1795	3.7-4.59	VARIABLE

Observations

After the readings taken on April 16th, we asked that *before* the vehicle was run further, the oil, oil filter and fuel filter be changed to remove the build-up of dirt that the system had moved from the engine.

On April 19th, this had not been done, and the vehicle had by then covered 1,795 kilometres since fitting the ECS system.

Despite the fact that these were then changed immediately, the engine was by then out of adjustment due to heavy contamination of the injectors and/or injection pump by sludges, carbon etc. purged from the engine by the ECS.

A sample of engine oil retained by IBV shows extremely heavy contamination.

The results show poor emissions.

After re-tuning of this engine, the improvements will be shown.

*This is why we **insist** on oil and filter changes after 800 kilometres*

⑤ ***Mercedes Series 300 Patrol Car (3 litre)*** ***number 50203***

							CHANGES	
Date	Test	kilometres	RPM	Temp.	CO	HC	CO	HC
April 12	1	54031	----	----	0.91%	217 ppm	-------	------
April 16	2	54170	----	----	1.16%	223 ppm	+27%	+2.8%
April 19	3	54	----	----	2.02%	250 ppm	+122%	+15%

Observations

This vehicle was involved in a crash on April 16th and it was therefore not possible to continue the tests, however, a basic mistake by ECS in the original set-up corrupted the results already taken.

Central Military Command

D - *IVECO Recovery Vehicle*

Observations

Of all the vehicles fitted with ECGS last January, this was the only one made available to us, but this could not be tested as it required a full service - we were not given access to the service record.

E - *Bedford Truck*
Not available

F - *Mercedes Tanker*
Not available

Comments

The results obtained proved as expected.

As described in our brochures, on used engines our system requires a 'settling-in' period to clear out the previously accumulated deposits, after which time these deposits must be removed from the engine by changing the oil, oil filter and (where fitted) fuel filter.

It is necessary to run the vehicles under normal road conditions for a minimum of 800 km after establishing the baseline emission tests before real improvements stabilise.

Optimum efficiency is not achieved until approximately 5,000 km have been covered, after which these improvements are maintained for at least 150,000 kilometres.

Our results obtained within this necessarily short period show that, even with such especially short distances covered, the system has once again adequately demonstrated its ability under actual field conditions to ***substantially reduce the production of poisonous gases in exhaust emissions.***

Data Sheets

Attached results sheets 1 to 7