

Testing report

Project name: Testing for measuring exhaust pollutants、driving capabilities and oil consumptions from the engine of Santana 2000 GLS after being filled with VITAL-8 gasoline additive

Client: Shanghai Yuanjun Trade Co. Ltd.

Automobile Laboratory of Tongji University

The Environmental Engineering Department of 711 Research Institute

8/26/2000

A red circular ink stamp is located in the bottom right corner of the page. It contains the Chinese characters '同济大学' (Tongji University) around the perimeter and a star in the center. The date '8/26/2000' is stamped over the bottom part of the seal.

Testing for measuring exhaust pollutants、 driving capabilities and oil consumptions from the engine in a Santana 2000 GLS after being filled with VITAL-8 gasoline additive

1. Objective

This test is relegated to Automobile Laboratory of Tongji University and the Environmental Engineering Department of 711 Research Institute by Shanghai Yuanjun Trade Co. Ltd. There are 3 aims in this testing:

- Measuring exhaust pollutants according to the GB14761-1999
- Testing accelerated performances according to the GB/TL2543-90
- Counting the fuel consumptions according to the GB/TL12545-90

2. Time、 Spot and Personnel

Time:

First: 14:00, 8/24/2000, Measuring the exhaust pollutants、 driving capabilities and oil consumptions with the primary car(a Santana2000 GLS)

Second: 8:00, 8/26/2000, Measuring the exhaust pollutants、 driving capabilities and oil consumptions with the above car after being filled with the gasoline that have been mixed with VITAL-8 gasoline additive . The proportion is 400 to 1,and the cubage of the gasoline is much more

than the one of the additive. In addition the car has run above 300km.

Spot: the Automobile Laboratory of Tongji University

Personnel: Zhou Jinhong、 Wang Zhenya、 Zhu Ming、 Li Jianjun

3. Testing Vehicle

Version and Brand (name): SANTANA2000 GLS

Engine Version: JV

Engine Serial Number: 483538

Rating Power: 66kW

Emission Cubage: 1.8L

Derailleur Version: manual driving

Step: 5

Driving Wheel Air Pressure: 180kPa

Manufactory Defined Value: 180kPa

Vehicle Basic Mass: 1240kg

Running Mileage: 13340km

Car Number Plate: HUA-07004

Car Frame Number: 21621

Fuel Density: Gasoline 0.735kg/L

Number of Cylinders: 4

Equivalent Inertia: 1130kg

4. Equipment

The version of the machine for measuring power in underpan:

Germany SCHENCK KOME G (single drum DC)

The model of the machine for measuring power in under pan:

EMDY48C

Exhaust Analyzer Version: Germany PIERBURG AMA 2000(D)

The sort of the constant volume sampling equipment: CVS-CFV

The model of the constant volume sampling equipment:

CVS-CFV-12WT

Automatic follow pneumatic engine: Self-make by Automobile

Department of Tongji University

Instruments for measuring temperature、air pressure : Germany Testo

445

Idle speed emission analyzer: U.K. Kane Auto5-1

5. Atmosphere state in the laboratory

Temperature	$25.0 \pm 1.0^{\circ}\text{C}$
Air pressure	$101.0 \pm 1.0\text{kPa}$

6.The machine for measuring power in the underpan

Experiment method: sliding energy method

Speed (km/h)	10	20	30	40	50	60	70	80	90	100	110	120
Indicative power(kW)	0.45	1.06	1.73	2.61	3.70	5.21	7.36	9.76	12.52	15.38	19.57	26.27

7.The datum of the exhaust pollutant measurement and the calculated result

The first city operating mode

Exhaust pollutant	Dilute emission concentration	Dilute air concentration	Y Calibrating concentration	Emission mass	
l	Ce	Cd	Ci	Mi(g/test)	Mi(g/km)
HC(ppm)	61.98	2.73	59.38	12.00	2.91
NO _x (ppm)	22.15	0.12	22.04	6.07	1.47
CO(ppm)	1345.7	12.88	1333.45	181.37	3.97
CO ₂ (%)	0.51	0.04			
HC+NO _x	84.13	2.85	81.42	18.07	4.38

The first suburb highway operating mode

Exhaust pollutant	Dilute emission concentration	Dilute air concentration	Y calibrate concentration	Emission mass	
l	Ce	Cd	Ci	Mi(g/test)	Mi(g/km)
HC(ppm)	80.67	3.45	77.57	7.51	1.08
NO _x (ppm)	154.2	0.35	153.89	20.30	2.93
CO(ppm)	1892.2	16.8	1877.11	122.25	17.62
CO ₂ (%)	1.17	0.04			
HC+NO _x	234.87	3.8	231.46	27.81	4.01

The second city operating mode

Exhaust pollutant	Dilute emission concentration	Dilute air concentration	Y calibrate concentration	Emission mass	
l	Ce	Cd	Ci	Mi(g/test)	Mi(g/km)
HC(ppm)	46.9	2.67	4.36	8.87	2.16
NO _x (ppm)	28.17	0.06	28.11	7.17	1.75
CO(ppm)	1005.91	11.85	99.63	133.81	32.6
CO ₂ (%)	0.54	0.04			
HC+NO _x	75.07	2.73	72.47	16.03	3.91

The second suburb highway operating mode

Exhaust pollutant	Dilute emission concentration	Dilute air concentration	Y calibrate concentration	Emission mass	
l	Ce	Cd	Ci	Mi(g/test)	Mi(g/km)
HC(ppm)	69.87	3.01	67.18	6.84	0.98
NO _x (ppm)	176.3	0.26	176.07	22.87	3.28
CO(ppm)	1692.4	11.73	1681.91	115.28	16.54
CO ₂ (%)	1.2	0.05			
HC+NO _x	246.17	3.27	243.25	29.71	4.26

The summation of the exhaust pollutant
(city operating mode + suburb operating mode)

	CO (g/km)	HC + NO _x (g/km)
The first testing	27.44	4.15
The second testing	22.49	4.13

6. Testing datum of the accelerated vehicle

Speed and step	The first testing	The second testing
0-120km/h(1-5 step)	39.79	33.98
40-120km/h(5th step)	44.05	40.43

7. The testing datum in the condition of equal speed oil consumption

Oil consumption(L/100km)

Speed (km/h)	The first testing	The second testing
50	7.676	7.183
90	8.965	8.711

8. experiment datum in the condition of idle speed emission

	Idle speed		High idle speed	
	CO(%)	HC(ppm)	CO(%)	HC(ppm)
The first	1.74	159	3.57	190

The second	1.48	124	2.27	173
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Recommendation

The automobile laboratory of the Automobile Engineering Department in Shanghai Tongji University is entrusted to test each performance guideline of the VITAL-8 gasoline additive offered by Shanghai Yuanjun trade Co. Ltd. The testing is conducted in accordance with the up to date GB.

The performances of the apparatus used in the test are absolutely accorded with the requirement of the correlative standard.

The engine of the car used in the testing have the model of carburetion, with no activator oxidation apparatus.

The testing results indicate that the performances of the car are greatly increased after we fill its engine with the gasoline that have been mixed with the gasoline additive.

The results are showed as follows:

1. The exhaust pollutants of HC and CO decrease about 20%
2. Improving the driving performances about 10%
3. Reducing the oil consumptions about 6% per 100km

This kind of gasoline additive can accelerate the burning , reduce the creations of carbon ,and make the burning farther sufficiently.

In a ward, the gasoline additive makes high improvements of the cars ' integrated qualities.

Automobile Laboratory of the Automobile Engineering Department in Shanghai
Tongji University



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