



Automotive

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Garching, 2010-08-18

Our reference:

AM-AAA1/GAR-bb

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Test Report

on efficiency of RVS Technology® products for combustion engines with regards to emissions and fuel consumption.

Test Report No.: 10-00053-UA-GBM-00

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1. Terms of reference

Oy RVS Technology Ltd., Pultitie 2, 00880 Helsinki, Finland, offers a series of patented protection and restoration products to reduce fuel consumption and emissions.

TÜV SÜD Automotive GmbH was commissioned to test the efficiency of some of the above mentioned products (see item 2 and 4) with regard to emissions and fuel consumption when used in vehicles.

In order to receive relevant and comparable results the vehicles to be tested were chosen using following criteria:

- The engine type of each test vehicle must be similar and from the same "engine family"
- The engines represent, related to vehicles of that age, modern engines with low consumption and low emission technology
- The vehicle brand and type is popular all over the world and in particular in Europe
- All vehicles have got a manual gearbox
- The mileage should be 150.000 to 230.000 km and the initial registration year of the vehicles from 2000 to 2003.
- TÜV SÜD Automotive chooses and takes the responsibility of the technical condition of the vehicles

The natural selection was VAG. All vehicles tested in this project phase were equipped with VAG 4-cylinder 1,9 TDI engines, produced 2000 to 2003.

2. Product description

The manufacturer, Oy RVS Technology Ltd., describes its products and technology functions as follows:

"RVS Technology® is a patented "auto-reactive" protection and restoration technology that modifies the metal friction parts of the engines and other devices producing a durable triboceramic structure on the friction surfaces. This structure has a very low friction coefficient that reduces the mechanical resistance and wears resulting in manifold positive effects in the mechanisms. The lubricants act only as intermediate agent that transfer the RVS Technology® compounds to the friction zones. The current improved 3^d generation RVS Technology® products have been manufactured utilizing CerLub technology."

The products tested in this project, as they are available in the market, were provided by Oy RVS Technology Ltd. and are described below, including description of application acc. to instruction manuals:

RVS Technology® "Engine Treatment D4" consists of 1 bottle with liquid plus 1 tube with gel.

One package is supposed to be used for 2-4 liters oil capacity.



The engine shall be at normal operating temperature, liquid and gel at room temperature. Squeeze the gel completely into the bottle, then shake it for 20-30 s. Pour half the content into the engine, which shall then idle for 15 min. Stop the engine for 1 min and shake the mixture well for 20-30 s, before pouring it completely into the engine. Run the vehicle for 30 min avoiding heavy engine loading.

For the first treatment drive another 300-400 km without heavy engine load.

To complete the procedure, repeat the treatment with new oil following the same procedure, but 1.500-2.000 km.

RVS Technology® "Transmission Treatment T3" consists of 1 syringe, 1 hose and a tube with liquid.

One package is supposed to be used for 1-3 liters of oil capacity.

Squeeze the content of the tube into the syringe and add appr. 20 ml of oil from the gearbox and take air into the syringe until piston edge is at 60 ml marking (with hose end upwards). Shake the syringe until mixture inside is homogenous, the squeeze the content into the gearbox. Drive the vehicle preferably under urban conditions.

RVS Technology® "Nanoceramic Injection Pump Protection & Restoration Diesel":
Consists of 1 bottle with liquid.

Shake the bottle well for 20-30 s until the mixture in the bottle is homogenous, no sediment shall remain on the bottom. Pour the content in an almost empty tank and add diesel for appr. 200 km. Operate the engine preferably for 2-3 hours without stopping it.

3. Test basis

The tests were performed on three vehicles with engines from the above mentioned engine family. Vehicles were taken from the market by TÜV SÜD Automotive GmbH and were handled only by TÜV SÜD Automotive GmbH staff during the complete project phase. All vehicles were pre-checked prior to the project start regarding general condition, exhaust system, error memory, air filter, oil, service check book etc., including test run. The modifications were conducted according to the instruction manuals. Additional tests regarding other effects, such as material compatibility or long-term effects were not subject of this project.

4. Test

All measurements were performed in TÜV SÜD Automotive GmbH emission test center in Heimsheim, Germany, according to relevant European emission test regulations. All endurance tests were carried out on the street in a mix of urban, extra-urban and Autobahn-cycles.

Test vehicles

The following three test vehicles were used in this project phase (for more details see enclosures):



	Vehicle 1	Vehicle 2	Vehicle 3
	VW Golf 1,9 TDI	VW Golf 1,9 TDI	Audi A4 1,9 TDI
Power	74 kW	66 kW	81 kW
Gear	manual (5)	manual (5)	manual (5)
Initial registration	03/2001	07/2000	01/2000
VIN	WVWZZZ1JZ1W366099	WVWZZZ1JZ1W161663	WAUZZZ8DZYA104515
Mileage before 1st measurement	152.865 km	228.005 km	180.237 km
Endurance test distance	3.000 km	4.000 km	5.000 km

Test procedure

Following the pre-check of each the vehicles were driven to the emission test center in Heimsheim.

Three emission tests acc. to relevant European regulations (see attachments) were conducted with the vehicles in their initial condition.

Following this, the first modification was done, consisting of:

- application of one "RVS Technology[®] Engine Treatment D4" to engine oil according to the instructions
- application of one "RVS Technology[®] Transmission Treatment T3" into the gear-box according to instructions
- 400 km endurance test on the street (no high speed)

Three emission tests acc. to relevant European regulations (see attachments) were conducted with the vehicles after the first modification.

The second modification was done following this procedure:

- engine oil change with standard manufacturer's approved engine oil
- application of one "RVS Technology[®] Engine Treatment D4" to engine oil according to the instructions
- endurance test of 3.000 to 5.000 km (see each vehicle) on the street
- during endurance test, application of one "RVS Technology[®] Nanoceramic Injection Pump Protection & Restoration for Diesel engines" to one tank content according to the instructions

Three emission tests acc. to relevant European regulations (see attachments) were conducted with the vehicles after the second modification.

Results

For detailed results of emission behavior and fuel consumption please check the enclosures.

The table summarizes the results for fuel consumption and CO2:

	Vehicle 1			Vehicle 2			Vehicle 3		
	Initial	1st modif.	2nd modif.	Initial	1st modif.	2nd modif.	Initial	1st modif.	2nd modif.
CO2 [g/km]	147	141	140	150	147	142	157	150	153
Fuel consumption [l/100 km]	5,6	5,4	5,3	5,7	5,6	5,4	6,0	5,7	5,9
Reduction of fuel consumption to initial value [%] *	-	4,4	4,7	-	2,4	5,6	-	4,5	2,7

* : Percentages based on exact values (see enclosures)

5. Summary

Oy RVS Technology Ltd., Pultitie 2, 00880 Helsinki, Finland, offers, as they declare, a series of "auto-reactive" protection and restoration products designed for triboceramic modification of the metal friction parts of the engines and devices in order to reduce mechanical resistance, fuel consumption, emissions and wear and in order to protect against wear.

TÜV SÜD Automotive GmbH was commissioned to test the efficiency of some of the above mentioned products (see item 2 and 4) with regard to emissions and fuel consumption when used in vehicles.

Testing covered the following steps:

1. Choice of suitable test vehicles:
VW/Audi 1,9 TDI-engines, up to model year 2001, 150.000-230.000 km
2. Emission/fuel consumption measurements in initial condition
3. Treatment with RVS Technology® D4, T3 and INJECTION PUMP products acc. to instructions, incl. endurance test on the street
4. Emission/fuel consumption measurements after first and second treatment

Results

With all three vehicles the fuel consumption was decreased compared to initial measurements.

The fuel consumption and CO₂-emissions decreased in all three tested VAG-family Diesel vehicles compared to the initial measurements. According to the results of the three tested vehicles, reductions of up to 5.6 % were measured, with an average over 3 vehicles of 4.3 %.

While operated by TÜV SÜD Automotive GmbH, in normal operation no negative effects due to the use of RVS Technology[®] products on the functions on the engine or transmission could be detected.

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München, 2010-08-18
TÜV SÜD Automotive GmbH



Bastian Babin
Environmental and Powertrain / Emissions

6. Enclosures

- 1.) Summary VW Golf IV 1,9TDI 74kW, dated 09.06.10, 1 page (vehicle 1)
(based on emission test reports A2_090512_035, A2_090513_027, A2_090514_022, A2_090513_003, A2_090520_004, A2_090522_003, A2_090602_008, A2_090603_008, A2_090604_006)
- 2.) Summary VW Golf IV 1,9TDI 66kW, dated 09.06.10, 1 page (vehicle 2)
(based on emission test reports A2_091002_004, A2_091005_004, A2_091005_011, A2_091007_004, A2_091008_012, A2_091009_003, A2_091020_016, A2_091021_016, A2_091022_005)
- 3.) Summary Audi A4 1,9TDI 81kW, dated 09.06.10, 1 page (vehicle 3)
(based on emission test reports A2_091217_005, A2_091218_002, A2_100105_002, A2_100112_003, A2_100113_003, A2_100114_002, A2_100208_006, A2_100209_002, A2_100210_012)



einer Abgasmessung an einem Personenkraftwagen bei der TÜV SÜD Automotive GmbH,
Arbeitsgebiet Emissionen

Diese Messergebnisse gelten nur für das Fahrzeug mit der genannten Identnummer

Angaben zum Fahrzeug:

Fahrzeug:	
Hersteller:	VW
Typ / Ausf.:	1J / SEATDX01
Handelsbez.:	Golf
Identnummer:	WWWZZZ1JZ1W366099
Getriebe:	<input checked="" type="checkbox"/> Handschaltgetriebe <input type="checkbox"/> Automatikgetriebe
Anzahl der Gänge:	5

Motor:	
Hersteller:	VW
Typ:	ATD
Art:	<input type="checkbox"/> Ottomotor <input checked="" type="checkbox"/> Dieselmotor
Nennleistung:	74/4000 kW / min ⁻¹
Hubraum:	1896 cm ³

Angaben zur Prüfung:

Beginn der Prüfung:	11.5.2009
Prüfung:	Typ I
Richtlinie:	70/220/EWG
Fassung:	2003/76; Stufe A (Euro 3)

Schwungmassenklasse [kg]:	1590
Leistung [kW] @ 80 km/h:	7,5
Tachostand vor der Prüfung [km]:	152.865
Kraftstoffdichte [kg/l]:	0,8336

Ergebnisse ohne DF:						
Abgabe zum Kat	CO	NO _x	HC	HC+NO _x	CO ₂	Verbrauch
	[g/km]	[g/km]	[g/km]	[g/km]	[g/km]	[l/100km]
Anlieferungszustand	0,348	0,463	0,068	0,531	145,8	5,5
	0,369	0,483	0,072	0,555	147,8	5,6
	0,407	0,475	0,083	0,558	147,0	5,6
S (Mittelwert Anlieferung)	0,3747	0,4737	0,0743	0,5480	146,87	5,59
Modifikation 1	0,412	0,498	0,083	0,581	140,7	5,4
	0,388	0,488	0,076	0,564	140,3	5,3
	0,443	0,484	0,093	0,577	140,4	5,3
M (Mittelwert Modif. 1)	0,4143	0,4900	0,0840	0,5740	140,47	5,35
Modifikation 2	0,331	0,553	0,064	0,617	139,5	5,3
	0,349	0,534	0,067	0,601	140,1	5,3
	0,350	0,533	0,067	0,601	140,5	5,3
M (Mittelwert Modif. 2)	0,3433	0,5400	0,0660	0,6063	140,04	5,33
G (Grenzwert) 2003/76; Stufe A (Euro 3)	0,64	0,50	--	0,56	--	--
DF (Verschlechterungsfaktor)	1,1	1,0	--	1,0	--	--
G/DF	0,582	--	--	0,560	--	--
Typprüfwerte (incl. DF)	0,073	0,330	--	0,355	--	--

Garching, 09.06.10

P. Kallen

Dipl.-Ing. (FH) P. Kallen
AM-UAA1

PRÜFLABORATORIUM
TÜV SÜD Automotive GmbH
TÜV SÜD Gruppe
Engineering Center D-71296 Heimsheim



einer Abgasmessung an einem Personenkraftwagen bei der TÜV SÜD Automotive GmbH,
Arbeitsgebiet Emissionen

Diese Messergebnisse gelten nur für das Fahrzeug mit der genannten Identnummer

Angaben zum Fahrzeug:

Fahrzeug:	
Hersteller:	VW
Typ / Ausf.:	1J / SEALHX01
Handelsbez.:	Golf
Identnummer:	WWWZZZ1JZ1W161663
Getriebe:	<input checked="" type="checkbox"/> Handschaltgetriebe <input type="checkbox"/> Automatikgetriebe
Anzahl der Gänge:	5

Motor:	
Hersteller:	VW
Typ:	ALH
Art:	<input type="checkbox"/> Ottomotor <input checked="" type="checkbox"/> Dieselmotor
Nennleistung:	66/4000 kW / min ⁻¹
Hubraum:	1896 cm ³

Angaben zur Prüfung:

Beginn der Prüfung:	31.7.2009
Prüfung:	Typ I
Richtlinie:	70/220/EWG
Fassung:	2003/76; Stufe A (Euro 3)

Schwungmassenklasse [kg]:	1470
Leistung [kW] @ 80 km/h:	7,3
Tachostand vor der Prüfung [km]:	228.005
Kraftstoffdichte [kg/l]:	0,8336

Ergebnisse ohne DF:						
Abgabe zum Kat	CO	NO _x	HC	HC+NO _x	CO ₂	Verbrauch
	[g/km]	[g/km]	[g/km]	[g/km]	[g/km]	[l/100km]
Anlieferungszustand	0,668	0,499	0,166	0,666	150,6	5,8
	0,618	0,508	0,139	0,646	151,3	5,8
	0,609	0,497	0,145	0,642	149,2	5,7
S (Mittelwert Anlieferung)	0,6317	0,5013	0,1500	0,6513	150,37	5,74
Modifikation 1	0,584	0,483	0,133	0,616	146,6	5,6
	0,631	0,494	0,148	0,643	147,0	5,6
	0,608	0,481	0,141	0,622	146,1	5,6
M (Mittelwert Modif. 1)	0,6077	0,4860	0,1407	0,6270	146,57	5,60
Modifikation 2	0,535	0,473	0,115	0,588	142,6	5,4
	0,560	0,478	0,123	0,602	141,2	5,4
	0,533	0,487	0,117	0,605	142,7	5,4
M (Mittelwert Modif. 2)	0,5427	0,4793	0,1183	0,5983	142,17	5,42
G (Grenzwert) 2003/76; Stufe A (Euro 3)	0,64	0,50	--	0,56	--	--
DF (Verschlechterungsfaktor)	1,1	1,0	--	1,0	--	--
G/DF	0,582	--	--	0,560	--	--
Typprüfwerte (incl. DF)	0,117	0,369	--	0,040	--	--

Garching, 09.06.10

Dipl.-Ing. (FH) P. Kallen
AM-UAA1

PRÜFLABORATORIUM
TÜV SÜD Automotive GmbH
TÜV SÜD Gruppe
Engineering Center D-71296 Heimsheim



einer Abgasmessung an einem Personenkraftwagen bei der TÜV SÜD Automotive GmbH,
Arbeitsgebiet Emissionen

Diese Messergebnisse gelten nur für das Fahrzeug mit der genannten Identnummer

Angaben zum Fahrzeug:

Fahrzeug:	
Hersteller:	Audi
Typ / Ausf.:	B 5 / AAVGF1
Handelsbez.:	A4 Avant
Identnummer:	WAUZZZ8DZYA104515
Getriebe:	<input checked="" type="checkbox"/> Handschaltgetriebe <input type="checkbox"/> Automatikgetriebe
Anzahl der Gänge:	5

Motor:	
Hersteller:	VW/Audi
Typ:	AVG
Art:	<input type="checkbox"/> Ottomotor <input checked="" type="checkbox"/> Dieselmotor
Nennleistung:	81/4150 kW / min ⁻¹
Hubraum:	1896 cm ³

Angaben zur Prüfung:

Beginn der Prüfung:	17.12.2009
Prüfung:	Typ I
Richtlinie:	70/220/EWG
Fassung:	96/69/EG (Euro 2)

Schwungmassenklasse [kg]:	1360
Leistung [kW] @ 80 km/h:	7,3
Tachostand vor der Prüfung [km]:	180.237
Kraftstoffdichte [kg/l]:	0,8336

Ergebnisse ohne DF:						
Abgabe zum Kat	CO	NO _x	HC	HC+NO _x	CO ₂	Verbrauch
	[g/km]	[g/km]	[g/km]	[g/km]	[g/km]	[l/100km]
Anlieferungszustand	0,643	0,707	0,209	0,916	158,6	6,1
	0,603	0,688	0,164	0,852	155,7	5,9
	0,675	0,695	0,168	0,863	157,8	6,0
S (Mittelwert Anlieferung)	0,6403	0,6967	0,1803	0,8770	157,37	6,01
Modifikation 1	0,635	0,630	0,161	0,791	150,5	5,7
	0,703	0,626	0,193	0,818	149,5	5,7
	0,654	0,633	0,176	0,809	150,1	5,7
M (Mittelwert Modif. 1)	0,6640	0,6297	0,1767	0,8060	150,03	5,74
Modifikation 2	0,656	0,629	0,184	0,812	154,0	5,9
	0,642	0,635	0,187	0,822	152,2	5,8
	0,639	0,654	0,191	0,845	153,2	5,9
M (Mittelwert Modif. 2)	0,6457	0,6393	0,1873	0,8263	153,13	5,85
G (Grenzwert) 96/69/EG (Euro 2)	1,00	--	--	0,70	--	--
DF (Verschlechterungsfaktor)	1,1	--	--	1,0	--	--
G/DF	0,909	--	--	0,700	--	--
Typprüfwerte (incl. DF)	0,530	--	--	0,604	--	--

Garching, 09.06.10

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PRÜFLABORATORIUM
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