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ENGINE TEST BED REPORT · JUNE 2003

AVIA 712.18.1 diesel: worn cylinders caught up with the sound ones

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PRODUCT	TEST OBJECT	DOCUMENT TYPE
XADO revitalizant engine oil additive · treatment by the standard procedure	AVIA 712.18.1 diesel inline four-cylinder, 3596 cm³, 60 kW · A21.1F van	Measurement report of the Slovak University of Technology

MACHINE	MILEAGE AT START	WHAT WAS MEASURED
AVIA van, type A21.1F AVIA 712.18.1 engine	≈ 190 000 km	Compression on all four cylinders; torque and effective power; hourly and specific fuel consumption; exhaust gas temperature; smoke opacity; oil pressure

Measurements on an engine test bed with a Schenck WS 230 dynamometer: speed curve 1200-2800 rpm at 100 % fuel delivery, before and after treatment.

Key results

↑ 3.5-5.4 %

compression of the lagging cylinders, 28-28.5 → 29.5 bar against 30 bar on the sound ones

↓ 1.2-5.1 %

exhaust gas temperature, 571-665 → 542-646 °C, all nine speed points

Cylinder compression — before and after 18 hours of running

CYLINDER	BEFORE TREATMENT	AFTER TREATMENT	CHANGE
No. 1 (from the flywheel)	28 bar	29.5 bar	+1.5 bar
No. 2	28.5 bar	29.5 bar	+1.0 bar
No. 3	30 bar	30 bar	no change
No. 4	30 bar	30 bar	no change
Spread between cylinders	2 bar	0.5 bar	evened out

Cylinders 3 and 4 were sound and stayed at the same level: the coating builds up where there is wear. Treatment — 18 h of idling at 830 rpm.

Exhaust gas temperature across the speed curve points

SPEED, rpm	BEFORE TREATMENT	AFTER TREATMENT	CHANGE
1200	571 °C	542 °C	−29 °C
1400	577 °C	559 °C	−18 °C
1600	584 °C	577 °C	−7 °C
1800	599 °C	590 °C	−9 °C
2000	611 °C	600 °C	−11 °C
2200	643 °C	615 °C	−28 °C
2400	658 °C	628 °C	−30 °C
2600	665 °C	646 °C	−19 °C
2800	657 °C	633 °C	−24 °C

Measured at the outlet of the exhaust manifold, 100 % fuel delivery. Both runs were made with the engine at the same thermal state.

Test laboratory conclusion

Following the 18-hour test with XADO revitalizant, the Department of Automobiles, Ships and Internal Combustion Engines of the Slovak University of Technology in Bratislava recorded: «An increase in the compression pressures of cylinders 1 and 2 occurred, and they came closer to the compression pressures of cylinders 3 and 4». The exhaust gas temperatures with XADO were «from 7 to **30 °C** lower, which may be connected with the measured increased compression pressure of cylinders 1 and 2 of the engine». The engine arrived at the test bed with 190 000 km of mileage, and the treatment was carried out without disassembly — over 18 hours of idling. The laboratory notes that a full improvement of the engine's complex parameters requires from 100 to 450 hours of operation, and recommends repeating the measurements after that period: within the 18-hour term the differences in power and fuel consumption remained within the measurement accuracy.

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The results refer to the AVIA 712.18.1 diesel engine of an A21.1F van with about 190 000 km of mileage and to an 18-hour test bed treatment; on other machinery and with other service hours the figures may differ. The original report of the Slovak University of Technology in Bratislava, with signatures and stamp, is published in full and available for download.