

ENGINE TREATMENT REPORTS · OCTOBER 2008 — FEBRUARY 2009

LAZ 52528 and Toyota diesels: compression rose and evened out, no teardown

ArcelorMittal Kryvyi Rih JSC, vehicle fleets No. 10 and No. 11 · measurements: UPA engineering bureau and plant mechanics jointly with XADO LLC

Kryvyi Rih, Ukraine · treatment cycle 15.10.2008 – 05.02.2009 · reports dated 20.03.2009

PRODUCT

XADO revitalizant gel
for diesel engines
full three-stage cycle ·
«VitaFlush» oil system cleaner
before treatment

TEST OBJECTS

Two diesel engines
LAZ 52528, reg. no. AE 3644
AA · TOYOTA HACE, reg. no.
AE 3149 AT

DOCUMENT TYPE

Company reports
dated 20.03.2009
approved by the fleet
managers, signed by the
commission

VEHICLE, REG. NUMBER	UNIT	MILEAGE AT START / OVER CYCLE	WHAT WAS MEASURED
LAZ 52528, AE 3644 AA	Vehicle fleet No. 11	71 363 / 42 192 km	Compression per cylinder, spread between cylinders
TOYOTA HACE, AE 3149 AT	Vehicle fleet No. 10	586 831 / 39 130 km	Compression per cylinder, spread between cylinders

ZEGA 363 compression tester: measurement before treatment and a repeat one after the full cycle. Both vehicles stayed in the plant's normal service.

What was repeated on both engines

compression evened out across the cylinders

↑ **5.4-11.9 %**

average engine compression, 24.9-27.3 → 27.8-28.8
kgf/cm²

Compression per cylinder — both engines

VEHICLE	CYLINDER	BEFORE, kgf/cm ²	AFTER, kgf/cm ²	CHANGE, kgf/cm ²
LAZ 52528	I	28.0	29.0	+1.0
LAZ 52528	II	28.5	29.0	+0.5
LAZ 52528	III	28.3	29.0	+0.7
LAZ 52528	IV	28.0	29.5	+1.5
LAZ 52528	V	28.0	28.0	0
LAZ 52528	VI	22.8	28.0	+5.2
TOYOTA HACE	I	23.6	27.4	+3.8
TOYOTA HACE	II	24.8	27.5	+2.7
TOYOTA HACE	III	28.6	29.0	+0.4
TOYOTA HACE	IV	22.5	27.4	+4.9

The largest gain is on the most worn cylinders: the coating builds up where the wear is, and compression does not rise above the factory nominal.

Evening out of compression between cylinders

VEHICLE	SPREAD BEFORE	SPREAD AFTER	CHANGE
LAZ 52528, AE 3644 AA	5.7 kgf/cm ²	1.5 kgf/cm ²	3.8×
TOYOTA HACE, AE 3149 AT	6.1 kgf/cm ²	1.6 kgf/cm ²	3.8×

Even compression means even engine running. According to the conclusions of the reports, evening it out removes crankshaft imbalance and extends the service life until overhaul.

Conclusions of the company commission

The commission of ArcelorMittal Kryvyi Rih JSC recorded on both vehicles: after the full treatment cycle with XADO revitalizant compounds the compression "evened out and increased on practically all cylinders" — by **0.5-5.2 kgf/cm²** on the LAZ 52528 and by **0.4-4.9 kgf/cm²** on the TOYOTA HACE, while the spread between cylinders fell from **5.7-6.1** to **1.5-1.6 kgf/cm²**. The reports explain the rise in compression by "the formation of minimal thermal clearances in the cylinder-piston group owing to the build-up of a layer of XADO metal ceramics on the working surfaces of the parts", which helps optimise fuel combustion and increase engine power; the evening out, according to the commission's conclusion, removes crankshaft imbalance and extends engine service life by at least **1.5-2×**, while the cost of the treatment pays back within **2-4.5 months** of operation. Both vehicles completed the cycle on the plant's regular runs — without dismantling the engines and without taking the vehicles out of service.

XADO

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The results relate to the diesel engines of the LAZ 52528 and TOYOTA HACE vehicles under the operating conditions of ArcelorMittal Kryvyi Rih JSC; on other equipment and in other duty cycles the figures may differ. The estimates of service-life gain and payback periods are taken from the conclusions of the reports and are the calculations of their authors. The original reports dated 20.03.2009 are published in full and available for download.