TECHNICAL ACT DATED 10 OCTOBER 2002

KATO excavator: compression up with no repair downtime

Tri K LLC · approved by Director A. N. Koshelev · endorsed by XADO technology distributor A. V. Golubovsky

Kochubeyevskoye, Russia · measurements 23 Apr – 10 Oct 2002 · act dated 10 Oct 2002

PRODUCT

XADO RVS

repair-and-restoration compounds; applied to the cylinder walls through the injector ports

TREATED OBJECT

KATO excavator No. 150388

cylinder liner and piston group of the diesel engine, 8 cylinders

DOCUMENT TYPE

Technical act by the Tri K LLC commission

MACHINE	CONDITION AT THE START OF WORK	WHAT WAS MEASURED
KATO excavator No. 150388	Cylinder liner and piston group worn beyond permissible limits: increased oil burn-off, heavy smoking from the breather, harsh engine operation, loss of power	Compression in each of the 8 cylinders before treatment and after 600 engine hours of running

The repair was carried out without removing or dismantling the engine and without replacing worn parts — while the excavator stayed in regular service.

Key results

↑ 16.7-36.2 %

compression across the eight cylinders, 22-24 → 26-32 kgf/cm²

Compression by engine cylinder, kgf/cm²

CYLINDER	BEFORE TREATMENT, 23 APR 2002	AFTER 600 ENGINE HOURS, 10 OCT 2002	CHANGE
1	**22**	**26**	**+4 kgf/cm²** (+18.2 %)
2	**22**	**27**	**+5 kgf/cm²** (+22.7 %)
3	**22.5**	**28**	**+5.5 kgf/cm²** (+24.4 %)
4	**22**	**28.5**	**+6.5 kgf/cm²** (+29.5 %)
5	**23.5**	**30**	**+6.5 kgf/cm²** (+27.7 %)
6	**24**	**28**	**+4 kgf/cm²** (+16.7 %)
7	**23**	**28.5**	**+5.5 kgf/cm²** (+23.9 %)
8	**23.5**	**32**	**+8.5 kgf/cm²** (+36.2 %)
Engine average	**22.81**	**28.5**	**+5.69 kgf/cm²** (+24.9 %)

Between the two measurements the excavator ran **600 engine hours** in regular service. A gain was recorded in all eight cylinders.

Engine behaviour as observed by the operator

SYMPTOM	BEFORE TREATMENT	AFTER TREATMENT
Exhaust smoke	Increased smoke	Fell markedly within the first days of operation
Crankcase smoking	Heavy smoking from the breather	Marked reduction
Power	Significant loss	Increase
Noise and vibration	Harsh engine operation	Lower noise and vibration

Assessment by the excavator operator; these symptoms were not measured with instruments.

Findings of the commission

At the start of treatment the wear of the cylinder liner and piston group was beyond permissible limits. The commission of Tri K LLC recorded:

1. The treatment of the engine cylinders by XADO technology produced restoration of the wear on the working friction surfaces.
2. Direct savings from the use of XADO technology, as reduced spending on spare parts and on the work of replacing the engine's cylinder liner and piston group, amounted to approximately **80 %** (**60,000 rubles**).
3. Indirect economic effect (from being able to replace putting the excavator in for repair with continued regular operation, from lower fuel and lubricant consumption after treatment, etc.) was not taken into account by the commission.
4. The commission recommends the use of XADO technology for treating the assemblies of machines and mechanisms in order to restore worn units, protect them against wear, extend service life and save energy resources, as well as to reduce spending on spare parts, and considers it advisable to include such treatment in the schedule of planned preventive maintenance.

XADO

The results relate to the diesel engine of KATO excavator No. 150388 with the cylinder liner and piston group worn beyond permissible limits; on other machinery and with a different condition of the assembly the figures may differ. RVS is an obsolete XADO designation, the zero-generation compounds; the current product generation is revitalizants. The original act is published in full and available for download.