FINAL TECHNICAL REPORT AFTER SERVICE-LIFE RUN

Metal-cutting machine tools: accuracy restored without teardown — and it holds

SE KhMZ FED · measurements by the joint commission of SE KhMZ FED and XADO LLC; report approved by Chief Engineer — First Deputy Director V. A. Fadeev

Kharkiv, Ukraine · treatment from 18.06.2012 · final measurements 21–22.05.2014 · report dated 03.06.2014

PRODUCT

XADO revitalizant compounds

treatment without disassembly, during normal machine-tool operation

TREATED EQUIPMENT

Metal-cutting machine tools, shop No. 16

screw-cutting lathes IZh 1I611PF-1, TV-320 · cylindrical grinder 3B151

DOCUMENT TYPE

Final technical report by the plant and XADO commission

MACHINE	TYPE	WHAT WAS MEASURED
IZh 1I611PF-1	Screw-cutting lathe	Spindle runout, spindle bearing play, ovality and Ra of machined parts, current and power, vibration
TV-320	Screw-cutting lathe	Spindle runout, spindle bearing play, ovality and Ra of machined parts, current and power, vibration
3B151	Cylindrical grinder	Drive current and power draw, vibration level

The commission measured three times: before treatment, after the full treatment cycle and after the service-life run. Final measurements — 21–22 May 2014, shop No. 16, after 500-2432 h of operation.

Key results

↓ 33-50 %
radial and axial runout of the spindle mounting seat

↓ 30 %
radial play of spindle bearings, 0.01-0.03 mm

↓ 25-47 %
surface roughness Ra of parts, 2.2-2.25 → 1.18-1.65 µm

↓ 8.2 %
current draw at cutting modes under load

Accuracy: spindle assembly and machined parts

PARAMETER	MEASURED ON	CHANGE
Radial and axial runout of the mounting seat	Lathe spindle	Decreased **1.5-2×**
Radial play of bearings	Lathe spindle	Decreased by **0.01-0.03 mm** — **30 %** on average
Ovality	Reference workpieces	Decreased **1.5-2×**
Surface roughness Ra	Parts machined on the lathes	**2.2-2.25 → 1.18-1.65 µm**

Reference workpieces were machined at identical cutting modes before and after — the comparison reflects the condition of the machine tool, not the machining mode.

Drive energy consumption and machine vibration

PARAMETER	MODE	CHANGE
Current draw	Under load, fixed cutting modes	Reduced by **8.2 %**
Current draw	Idle run	Reduced by **9.8 %**
Power draw	Under load, fixed spindle speed	Reduced by **6.2 %**
Power draw	Idle run	Reduced by **7.1 %**
Vibration level	All treated machine tools	Reduced by **28-50 %**

Current and power are averaged over the IZh 1I611PF-1, TV-320 and 3B151 machines; before and after readings were taken at identical spindle speeds and cutting modes.

Commission findings

The commission of SE KhMZ FED and XADO LLC recorded the following:

1. Final measurements of the operating parameters of the IZh 1I611PF-1, TV-320 and 3B151 machine tools after the service-life run (**10 to 23 months** of operation since the start of treatment) showed that the operating parameters of the machines and the accuracy parameters of the manufactured parts, improved after the application of XADO revitalizant compounds, remain stable over at least **1200 h** of normal operation and are practically unchanged compared with the parameters obtained after **500 h** of running.
2. The stability of the machines' technical parameters and of the parts' accuracy parameters over an operating period of at least **1200 h** supports the conclusion that, after treatment of metal-cutting machine tools with XADO revitalizant compounds, the interval between overhauls can be extended by at least **1.5×**.

XADO

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The results apply to the IZh 1I611PF-1, TV-320 and 3B151 metal-cutting machine tools of the machining shops at SE KhMZ FED and to their normal operating modes; on other equipment and under other modes the figures may differ. The original technical report dated 03.06.2014, bearing the signatures of the commission and the plant stamp, is published in full and available for download.