

TEST REPORTS · OCTOBER 2005 — MARCH 2007

K-500 turbocompressors: less power draw and vibration without opening the unit

JSC Zaporizhzhia Iron Ore Plant, power shop — air-blower station · reports approved by the plant's chief power engineer Yu. N. Bezruchko

Ukraine · reports dated 25.10.2005, April 2006 and 22.03.2007

PRODUCT

XADO revitalizants
staged addition of the
calculated amount of the
compound into the oil bath of
the running unit

TEST OBJECT

K-500 turbocompressor
units
serial No. 86, No. 2724, No.
11371 · line "turbocompressor —
gearbox — electric motor"

DOCUMENT TYPE

Three plant reports
with signatures and seals

MACHINE	OPERATING TIME BEFORE CONTROL MEASUREMENT	REPORT DATE	WHAT WAS MEASURED
Machine No. 1, serial No. 86	817 h	25.10.2005	power, current, vibration at 18 points, oil condition
Machine No. 2, serial No. 2724	422 h	April 2006	power, current, vibration at 16 points
Machine No. 3, serial No. 11371	655 h	22.03.2007	power, current, vibration at 16 points, oil temperature

Three units of one station were treated in succession, as a single cycle. Operating parameters were recorded by the plant's standard automatic control system.

What repeated on all three units

↓ **2.7-3.8 %**

power consumption under load,
2334-2998 → 2248-2918 kW

↓ **2.2-3.8 %**

stator current of the drive electric
motor, 193-266 → 188-256 A

↓ **19-56 %**

vibration displacement of bearing
supports No. 1-9, all three units

Power consumption by unit

MACHINE	MODE	BEFORE, kW	AFTER, kW	CHANGE
Machine No. 1, serial No. 86	under load	2334	2248	-3.7 %
Machine No. 1, serial No. 86	idle	586	547	-6.7 %
Machine No. 2, serial No. 2724	under load	2576	2477	-3.8 %
Machine No. 2, serial No. 2724	idle	723	662	-8.4 %
Machine No. 3, serial No. 11371	under load	2998	2918	-2.7 %
Machine No. 3, serial No. 11371	idle	1122	1036	-7.7 %

Power was recorded by the unit's standard control system. The report conclusions state a reduction of 2.7-3.8 % under load and 6.7-8.4 % at idle.

Stator current of the drive electric motor, under-load mode

MACHINE	BEFORE, A	AFTER, A	CHANGE
Machine No. 1, serial No. 86	193	188	-2.6 %

MACHINE	BEFORE, A	AFTER, A	CHANGE
Machine No. 2, serial No. 2724	230	225	-2.2 %
Machine No. 3, serial No. 11371	266	256	-3.8 %

Current was taken by the same standard system and in the same mode as power — an independent confirmation of the result on the electrical side.

Vibration of the bearing supports

MACHINE	MEASURING POINTS	TYPICAL REDUCTION	MAXIMUM
Machine No. 1, serial No. 86	18	14-61 %	82 %
Machine No. 2, serial No. 2724	16	22-41 %	62 %
Machine No. 3, serial No. 11371	16	18-56 %	85 %

SENDIG 911 vibrometer, vibration displacement of supports No. 1-9 — turbocompressor, gearbox and electric motor. Of the 50 points on the three units, 49 showed a reduction.

Conclusions of the plant reports

Three reports, approved by the chief power engineer of JSC Zaporizhzhia Iron Ore Plant, state one and the same result. For machine No. 2, serial No. 2724, the treatment "made it possible to reduce the power consumption under load by **3.8%**, while at idle the reduction in power consumption was **8.4%**. In addition, the vibration parameters decreased at all bearing supports by **22-57%**". For machine No. 3, serial No. 11371 — **2.7%** under load and **8.4%** at idle, "at individual points a reduction of **35-57%**"; for machine No. 1, serial No. 86 — **3.2%** and **6.7%**. The reports attribute the drop in vibration to the establishment of optimal thermal clearances in the bearings, which allows their service life to be extended. Not a single unit was disassembled for this: the compound was added in stages into the oil bath of the running machine.

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The results relate to the K-500 turbocompressor units of the air-blower station of JSC Zaporizhzhia Iron Ore Plant and to the operating modes recorded in the reports; on other machines and in other modes the figures may differ. The measurements were carried out by the personnel of the plant's power shop using the standard monitoring system together with representatives of XADO LLC. The originals of all three reports, with signatures and seals, are published in full and available for download.