



REPORT UNDER CONTRACT No. 87/2000-PD · DIKANEVSKY TREATMENT COMPLEX

NG-750-23 air blower: metal back on the gear teeth, less energy consumed

Dikanevsky biological treatment complex, Kharkiv · approved by Chief Engineer A. A. Kostenko;
measurements signed by the plant's chief mechanical engineer and chief power engineer
Kharkiv, Ukraine · work 14.07–14.09.2000 · control measurements 05.07–14.07 and 14.08–23.08.2000

PRODUCT	TREATED EQUIPMENT	DOCUMENT TYPE
XADOtechnology® treatment of gearbox friction units and blower bearing assemblies	NG-750-23 air blower, unit No. 3 STD-1250 electric motor · R-1000/1.43 gearbox · blower bearing assemblies	Report on restorative repair of friction units approved by the plant's chief engineer, stamped

UNIT	CONDITION BEFORE TREATMENT	WHAT WAS MEASURED
R-1000/1.43 gearbox, gear wheel — pinion pair	Tooth wear 15-25 % ; 15-20 % of the active profile with pitting and deep scoring near the pitch point	Tooth thickness at four points on the wheel and on the pinion, active profile, noise
Blower bearing assemblies	Scraping marks and lapping patches on the shaft — bearing shell contact	Axial displacement of the rotor, main oil pump pressure
Unit No. 3 as a whole	Actual running time 6100 h per year	Electricity consumed, read from the plant's standard meter

Treatment was carried out in July — September 2000; control inspection and measurement of the friction units followed {{400 hours}} of operation.

Key results

↑ **0.13-0.47 mm**

tooth thickness gain on the wheel and pinion, meshing zone, 400 h of operation

↓ **8.2 %**

electricity consumption of the unit, 217 560 → 199 680 kWh over 216 h

↓ **0.04 mm**

axial displacement of the blower rotor, 0.25 → 0.21 mm

R-1000/1.43 gearbox — tooth geometry and condition after 400 hours of operation

PARAMETER	MEASURED RESULT
Wheel — tooth thickness gain	0.16-0.32 mm in the meshing field zone
Pinion — tooth thickness gain	0.13-0.47 mm in the meshing field zone
Active tooth profile	72 % → 78 % of tooth height
Working surface of the teeth	Appearance of a smooth ground surface: pitting and scoring — stress concentrators — have disappeared
Gearbox noise in operation	5 dB below the initial level

Tooth thickness — ShchZN-18 gear tooth vernier caliper, TU 2-034-773-89: four control points on the wheel and four on the pinion, before treatment and after 400 hours of operation.

Blower bearing assemblies and lubrication system

PARAMETER	MEASURED RESULT
Axial displacement of the rotor	0.25 mm → 0.21 mm
Main oil pump pressure	increased by 5 %
Bearing shell surface	Greyish colour — the metal-ceramic layer starting to form

Measurements and inspection of the bearing shells were performed during the control inspection of the bearing assemblies after **400 hours** of operation.

Electricity use by unit No. 3 — 216 hours of operation before and after treatment

PERIOD	ELECTRICITY CONSUMED
05.07 – 14.07.2000, before treatment, 216 h	217 560 kWh
14.08 – 23.08.2000, after treatment, 216 h	199 680 kWh
Difference over an identical period	17 880 kWh — 8.2 %
Per year at the actual running time of 6100 h — as calculated in the report	504 944 kWh

Readings of the unit's standard electricity meter were taken twice a day; the tables are signed by the plant's chief mechanical engineer and chief power engineer.

Conclusions of the plant commission

The gearbox came in for repair with tooth wear of **15-25 %**. The commission recorded that treatment of the friction units of the NG-750-23 blower under XADOtechnology® provided:

1. A reduction of gearbox operating noise by **5 dB**.
2. The working surface of the teeth of the mating gears of the gearbox took on the appearance of a smooth ground surface, i.e. the pitting and scoring — stress concentrators — disappeared, which increases the failure-free service life of the gearbox.
3. On the working surface of the teeth in the meshing field zone of the gear train, a build-up of a metal-ceramic layer was found: on the wheel the gain was from **0.16 to 0.32 mm**, on the pinion — **0.13-0.47 mm**.
4. The active tooth profile increased by **8 %**.
5. The axial displacement of the blower rotor decreased from **0.25 to 0.21 mm**.
6. The main oil pump pressure increased by **5 %**.
7. As a result of the reduced friction coefficient in the gearbox and bearing assemblies, electricity consumption fell by **8.2 %**.

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The results relate to the NG-750-23 air blower with an R-1000/1.43 gearbox and an STD-1250 electric motor on unit No. 3 of the Dikanevsky treatment complex; with other machines and operating modes the figures may differ. The restorative repair was performed by XADO LLC specialists together with the plant's personnel; the measurements were taken and signed by the services of the Dikanevsky treatment complex. The original report with signatures and stamp is published in full and available for download.