

TWO REPORTS BY KhTsNTEI JSC · TREATMENT 30.11.2004 — 29.03.2005

Lift worm gearboxes: quieter, smoother and more efficient after a major overhaul

KhTsNTEI JSC — Kharkiv Centre for Scientific, Technical and Economic Information · approved by director E. V. Ryabov; measurements — head of department L. N. Trizna and XADO LLC lead engineer I. N. Sharaykin

Kharkiv, Ukraine · treatment 30.11.2004 — 29.03.2005 · reports signed in April 2005

PRODUCT

XADO revitalizants
compounds introduced into the
worm gearboxes of lift drives

TEST OBJECT

Worm gearboxes of
passenger
lift drives
serial no. 746/2 and no. 757/1 ·
both after a major overhaul

DOCUMENT TYPE

Two KhTsNTEI JSC reports
with signatures and seal

GEARBOX	CONDITION AT START	RUNNING TIME TO CONTROL MEASUREMENT	WHAT WAS MEASURED
Lift drive, serial no. 746/2	After a major overhaul, in intensive service	451 h	Current on three phases, noise level, vibration at seven points of the housing
Lift drive, serial no. 757/1	After a major overhaul, in intensive service	437 h	Current on three phases, noise level, vibration at seven points of the housing

Both gearboxes were treated in a single cycle 30.11.2004 — 29.03.2005; measurements before and after — ATK 2200 clamp meter, 00024 sound level meter, SENDIG 911 vibrometer.

What was repeated on both gearboxes

↓ **18-23 %**

drive current on all three phases,
10.4-11.0 → 8.0-9.0 A

↓ **25-60 %**

vibration displacement across
housing points, 8.16-77.6 →
4.15-26.6 µm

↓ **2.5-3 dB**

gearbox noise level, 78-79.5 →
75.5-76.5 dB

Drive current and gearbox noise

PARAMETER	GEARBOX No. 746/2, BEFORE → AFTER	GEARBOX No. 757/1, BEFORE → AFTER
Current, phase A	10.4 → 8.0 A · -23 %	10.5 → 8.5 A · -19 %
Current, phase B	10.8 → 8.5 A · -21 %	10.8 → 8.9 A · -18 %
Current, phase C	10.8 → 8.4 A · -22 %	11.0 → 9.0 A · -18 %
Gearbox noise level	78 → 75.5 dB	79.5 → 76.5 dB

Measurements taken with the lift travelling "up": current — ATK 2200 clamp meter, noise — 00024 sound level meter.

Vibration displacement at housing points, µm

MEASUREMENT POINT AND DIRECTION	GEARBOX No. 746/2, BEFORE → AFTER	GEARBOX No. 757/1, BEFORE → AFTER
Vertical, worm wheel bearing opposite the sheave	21.7 → 15.2	67.2 → 26.6
Vertical, worm wheel bearing away from the sheave	20.4 → 18.1	71.2 → 25.0
Vertical, worm bearing at the front	14.3 → 8.2	77.6 → 13.8
Axial, worm wheel bearing opposite the sheave	23.3 → 17.4	27.5 → 26.1
Axial, worm bearing at the front	10.0 → 7.9	17.6 → 12.3
Horizontal, worm wheel bearing opposite the sheave	8.16 → 4.15	40.3 → 8.62
Horizontal, worm bearing at the front	17.9 → 12.1	25.9 → 12.3

SENDIG 911 vibrometer, seven fixed points on the housing of each gearbox. A reduction was recorded at every point on both gearboxes.

Vibration acceleration and velocity — the same seven points

PARAMETER	GEARBOX No. 746/2, BEFORE → AFTER	GEARBOX No. 757/1, BEFORE → AFTER
Vibration acceleration, m/s ²	1.21-6.61 → 0.43-4.06	2.87-16.1 → 1.43-3.75
Vibration velocity, mm/s	0.337-0.831 → 0.115-0.492	0.688-1.88 → 0.358-1.18

The table shows the spread of values across the seven housing points of each gearbox, same SENDIG 911 vibrometer.

Conclusions of the reports

The KhTsNTEI JSC commission, joined by a XADO LLC lead engineer, recorded the following for both lifts. Gearbox No. 746/2: "power consumption decreased by an average of **22 %**, the noise level fell by **2.5 dB**, and the vibration level for each parameter fell by an average of **1.5×**". Gearbox No. 757/1: the treatment "made it possible to reduce power consumption by **18 %** and to reduce the vibration level for each parameter by an average of **2×**", the noise level — by **3 dB**. The measured series is the current drawn by the electric motor on three phases: **18-23 %** on both drives. Both gearboxes were already running after a major overhaul, so the improvement was obtained on top of a restored unit and, according to the reports, "made it possible to optimise the working clearances during run-in and to ensure individual matching of the mating parts to one another".



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The results relate to worm gearboxes of passenger lift drives that have undergone a major overhaul and operate under intensive service; on other units and duty modes the figures may differ. The originals of both reports, with signatures and seal, are published in full and available for download. The treatment was performed by, and the measurements were attended by, a representative of the compound supplier.