

ZMIEV TPP REPORT · TURBINE AND ELECTRICAL SHOPS

Flushing pump 3V 200/2: motor draws less current, treatment paid for itself

Zmiev TPP, Centrenergo OJSC · report approved by Yu. M. Stukalkin, Deputy Chief Engineer for Repairs;
signatures of the turbine and electrical shop foremen, plant stamp

Zmiev TPP, Ukraine · treatment 4 July — 3 August 2005 · repeat measurements after 518 h of
round-the-clock operation · report of August 2005

PRODUCT

XADO compounds
treatment of the bearing
assemblies of the pump and the
electric motor using XADO
technology

TREATED EQUIPMENT

Flushing pump SN-3,
model 3V 200/2 with drive
electric motor
pump bearings No. 3086313
and No. 6313 · motor bearings
No. 320 and No. 2320

DOCUMENT TYPE

Report of Zmiev TPP
signed by the commission
and stamped

ASSEMBLY**CONDITION BEFORE TREATMENT****WHAT WAS MEASURED**

Flushing pump SN-3, 3V
200/2

bearing radial clearances 0.16 and
0.11 mm

vibration of the shaft bearing housings
at four points

Drive electric motor

bearing radial clearances 0.14 and
0.11 mm (rear bearing newly
installed)

current draw on phases A, B, C under
load; vibration of the bearing housings
at six points

The pump runs round the clock; repeat measurements were taken at the same points after 518 hours of operation from the end of the full treatment cycle.

Key results

↓ **7.5 %**

current draw of the electric motor under load, 300 → 276-278 A

↓ **4-21 %**

vibration displacement of the pump and motor bearing housings, 4.4-61 → 4.3-47 μm

Current draw of the electric motor under load

PHASE	BEFORE TREATMENT, A	AFTER 518 h, A	CHANGE
Phase A	300.0	278	-7.3 %
Phase B	300.0	276	-8.0 %
Phase C	300.0	278	-7.3 %

Measurements under load before treatment and after 518 hours of operation. According to the conclusions of the report, the current draw under load decreased by 7.5 %.

Vibration of the pump shaft bearing housings

MEASUREMENT POINT	VIBRATION ACCELERATION, m/s ²	VIBRATION VELOCITY, mm/s	VIBRATION DISPLACEMENT, μm
Front housing, vertical	3.45 → 3.14	0.547 → 0.551	5.12 → 4.25
Front housing, horizontal	3.22 → 3.18	0.537 → 0.539	4.42 → 4.37
Rear housing, vertical	9.97 → 8.14	1.14 → 0.888	18.7 → 14.7
Rear housing, horizontal	8.37 → 6.47	1.12 → 1.32	19.2 → 18.7

Measurements were taken at ten reference points on the bearing housings — four on the pump and six on the electric motor — before treatment and after 518 hours of operation.

Vibration of the electric motor bearing housings

MEASUREMENT POINT	VIBRATION ACCELERATION, m/s ²	VIBRATION VELOCITY, mm/s	VIBRATION DISPLACEMENT, μm
Front housing, vertical	33.6 → 33.5	3.59 → 2.99	61.1 → 47.1
Front housing, horizontal	30.0 → 27.1	3.57 → 3.49	44.9 → 43.1

MEASUREMENT POINT	VIBRATION ACCELERATION, m/s ²	VIBRATION VELOCITY, mm/s	VIBRATION DISPLACEMENT, μm
Front housing, axial	21.3 → 20.7	2.88 → 2.72	49.0 → 40.1
Rear housing, vertical	42.6 → 41.3	2.60 → 2.54	38.5 → 33.2
Rear housing, horizontal	35.1 → 25.7	3.00 → 2.35	18.6 → 15.3
Rear housing, axial	36.6 → 26.2	3.46 → 2.34	56.9 → 33.9

Vibration displacement of the bearing housings decreased at all ten points; the largest decrease was in the axial direction of the motor rear housing.

Conclusions of the Zmiev TPP commission

The commission recorded in the report: according to the operating personnel, the pump runs in normal mode, with no complaints about the operation of the pump or the electric motor. The current draw under load decreased by **7.5 %**; the vibration level of the electric motor bearing housings, according to the conclusions of the report, by **15-45 %**, and according to the measurement tables the vibration displacement of the housings decreased at all ten reference points. Calculation given in the report: the power consumed by the electric motor under load is **132 kW**, so with a reduction of **7 %** the hourly saving is about **9 kW**, or **216 kWh** per day in round-the-clock operation. At a price of **0.14 UAH** per kWh this is **30 UAH** per day and about **850 UAH** per month. The cost of treating the 3V200/2 pump unit using XADO technology is **386 UAH**, so the payback period of the treatment is no more than two weeks in round-the-clock operation.

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The results relate to the flushing pump 3V 200/2 with drive electric motor at Zmiev TPP and to its round-the-clock operating mode; on other equipment and in other modes the figures may differ. The economic calculation was made by the authors of the report at the plant's internal 2005 tariff. The original report with the commission's signatures and stamp is published in full and available for download.