ZMIIVSKA TPP TEST REPORT · TURBINE SHOP

NTS-7G district heating pump: lower current draw and bearing vibration, no teardown

Zmiivska TPP, VAT "Zmiivska Teplova Elektrychna Stantsiia", turbine shop · approved by: chief engineer V. Ye. Savchenko

Kharkiv region, Ukraine · treatment and monitoring 4 July — 30 September 2005 · report dated 29.09.2005

PRODUCT

XADO "Restorative" grease

revitalizant for bearing units

TEST OBJECT

NTS-7G district heating pump

bearing units of the pump and its drive motor

DOCUMENT TYPE

Zmiivska TPP test report signatures, seal

MACHINE	CONDITION AT START OF TESTING	WHAT WAS MEASURED
NTS-7G district heating pump	In service; bearings No. 3086313 and No. 6313, radial clearance **0.19** and **0.08 mm**	Vibration of the front and rear bearing housings — vertical and horizontal
Pump drive motor	In service; bearings No. 322 and No. 2322, radial clearance **0.18** and **0.13 mm**	Current draw of phases A, B, C; vibration of the front bearing housing

The "after" readings were taken following {{515 h}} of operation — from 4 July to 30 September 2005, on running turbine shop equipment.

Key results

↓ 11.6 %

motor current draw under load, 25.8 → 22.8 A

↓ 23-66 %

vibration acceleration of pump and motor bearing housings, 12.9-224 → 9.05-56.9 m/s²

Motor current draw

MODE	BEFORE TREATMENT	AFTER 515 H	CHANGE
Under load — operating mode	25.8 A	22.8 A	−11.6 %
No load	20.4 A	16.8 A	−17.6 %

Current is identical across all three phases A, B, C. Under load: pump inlet pressure **2.4 kgf/cm²**, outlet pressure **8 kgf/cm²**.

Vibration of the pump and motor bearing housings

MEASUREMENT POINT	VIBRATION ACCELERATION, m/s²	VIBRATION VELOCITY, mm/s	VIBRATION DISPLACEMENT, µm
Pump, front housing, vertical	12.9 → 18.3	1.46 → 0.904	18.9 → 9.97
Pump, front housing, horizontal	13.0 → 10.0	0.893 → 0.518	9.95 → 4.53
Pump, rear housing, vertical	27.0 → 17.3	1.00 → 0.763	15.0 → 13.2
Pump, rear housing, horizontal	13.9 → 9.05	0.865 → 0.539	8.03 → 6.45
Motor, front housing, vertical	224.0 → 47.9	0.931 → 0.804	12.7 → 12.4
Motor, front housing, horizontal	166.0 → 56.9	1.30 → 1.48	21.5 → 22.6

Six control points on the bearing housings; for each of the three parameters vibration decreased at five points out of six.

Findings of the Zmiivska TPP commission

The commission of Zmiivska TPP recorded: The vibration level of the pump and motor bearing housings decreased in all measurement directions by **2 %** up to **4.5×** at individual points. The current drawn by the motor with the pump under load decreased by **11.6 %**, and with the pump fully unloaded — by **17.6 %**. At a power consumption under load of **285 kW**, the hourly saving is about **31 kW**, or **744 kW** per day in round-the-clock operation — that is **104 UAH** per day and about **3124 UAH** per month. The cost of treating the pump set with XADO technology is **225 UAH**, with a payback period of no more than three days. The expected annual economic effect is at least **18,500 UAH**, allowing for preventive maintenance and process downtime.

XADO

The results relate to the NTS-7G district heating pump with its drive motor at Zmiivska TPP; on other equipment and in other operating modes the figures may differ. The economic calculation is given in the report itself, at the plant tariff of 0.14 UAH per 1 kW·h for 2005. The original report with signatures and seal is published in full and available for download.