

TWO ACTS OF THE BOILER-TURBINE SHOP · TREATMENT SEPTEMBER 2005 – JANUARY 2006

Exhauster D5B and fan VGD 5B: bearing vibration and current down without dismantling

TETs-3 CJSC, boiler-turbine shop · acts approved by technical director E. V. Rudinskiy, signed by the head of the boiler-turbine shop, the senior foreman for boiler equipment and the foreman of the electrical shop

Kharkiv, Ukraine · treatment 23.09.2005 – 16.01.2006 · acts dated 22.02.2006

PRODUCT

XADO revitalizant compounds

bearing assemblies treated by XADO technology — with no dismantling and no machine downtime for repair

OBJECTS OF THE SERIES

Smoke exhauster D5B and hot-blast fan VGD 5B

bearings of the 320 and 200 kW drive motors, main and tail supports of the machine shafts

DOCUMENT TYPE

Two acts of the TETs-3 CJSC boiler-turbine shop with signatures and seal

UNIT	DRIVE	OPERATING TIME AFTER TREATMENT	WHAT WAS MEASURED
Smoke exhauster D5B, boiler-turbine shop	320 kW, 710 rpm	585 h	Vibration at 16 points, motor current, power consumption
Hot-blast fan VGD 5B, boiler-turbine shop	200 kW, 985 rpm	548 h	Vibration at 16 points, motor current across three phases

On each machine the motor bearings and the shaft supports were treated. The before and after measurements were taken in the same mode — at no load.

What repeated on both machines

↓ **8.6-12.5 %**

motor current, 20 → 17.5 A and 155-160 → 141.6-144 A

↓ **7-46 %**

vibration velocity of bearing supports, 1.01-7.66 → 0.78-2.73 mm/s

Power consumption of the drives

UNIT	PARAMETER	BEFORE	AFTER	CHANGE
Exhauster D5B	Motor current, A	20.0	17.5	−12.5 %
Exhauster D5B	Power consumption, kW	234.5	206.7	−11.8 %
Fan VGD 5B	Motor current, phase A, A	155.0	141.6	−8.6 %
Fan VGD 5B	Motor current, phase B, A	160.0	143.2	−10.5 %
Fan VGD 5B	Motor current, phase C, A	160.0	144.0	−10.0 %

The exhauster power was read from the electricity metering device; the fan current with clamp meters across three phases. For the fan the act states a reduction of power consumption by **9.3 %**.

Vibration velocity of the bearing supports, both machines

MEASUREMENT POINT	EXHAUSTER D5B, mm/s	FAN VGD 5B, mm/s
Motor rear support, vertical	2.41 → 0.992	1.97 → 1.04
Motor rear support, horizontal	2.44 → 1.79	2.72 → 1.67
Motor rear support, axial	3.39 → 1.97	2.85 → 2.26
Motor front support, vertical	5.78 → 1.11	2.09 → 2.26
Motor front support, horizontal	7.66 → 2.65	2.24 → 1.68
Motor front support, axial	3.56 → 1.88	2.69 → 2.51
Main shaft bearing, vertical	2.7 → 2.06	1.01 → 0.78
Main shaft bearing, horizontal	3.98 → 2.73	1.50 → 1.32
Main shaft bearing, axial	3.45 → 2.31	2.23 → 1.56
Tail shaft bearing, vertical	1.58 → 0.85	1.99 → 1.43
Tail shaft bearing, horizontal	1.44 → 1.35	1.91 → 1.03
Tail shaft bearing, axial	2.15 → 1.68	3.80 → 1.89

Vibrometer "SENDIG 911", 16 control points on each machine; the table shows the bearing supports. The range in the case header is taken from here.

Supports with the highest vibration before treatment

UNIT	POINT AND VALUE	BEFORE	AFTER
Exhauster D5B	Motor front support, vibration displacement (horizontal)	209.0 μm	68.3 μm
Exhauster D5B	Motor front support, vibration displacement (vertical)	163.0 μm	36.6 μm
Exhauster D5B	Main shaft bearing, vibration acceleration (horizontal)	28.5 m/s^2	18.4 m/s^2
Fan VGD 5B	Motor front support, vibration acceleration (axial)	29.8 m/s^2	11.9 m/s^2
Fan VGD 5B	Motor rear support, vibration acceleration (vertical)	14.1 m/s^2	4.94 m/s^2
Fan VGD 5B	Tail shaft bearing, vibration displacement (axial)	35.6 μm	16.3 μm

The same instruments and the same points as in the vibration velocity table: shown are the supports that were loaded the most before treatment.

Conclusions of the acts

The commission of TETs-3 CJSC recorded in both acts. For the D5B exhauster, after the full treatment cycle and **585 hours** of operation: "the power consumed by the electric motor decreased by **11.8%**; the consumed current decreased by **12.5%**; the vibration parameters of all bearing assemblies during exhauster operation decreased by **27-55%**. At individual control points of the bearing assemblies the vibration level dropped **3-5×**". For the VGD 5B hot-blast fan, after **548 hours** of operation: "the power consumed by the electric motor decreased by **9.3%**; the vibration parameters of the bearing assemblies during fan operation in unloaded mode decreased by **11-46%**". Before treatment the radial clearances of the bearings reached **0.28 mm**, and the vibration displacement of the supports reached **209 μm** : both machines came to this result without opening the assemblies and without being taken out for repair.

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The results relate to the bearing assemblies of the draught machines of the boiler-turbine shop — the D5B smoke exhauster with a 320 kW drive and the VGD 5B hot-blast fan with a 200 kW drive; on other units and in other modes the figures may differ. The originals of both acts with the signatures and seal of TETs-3 CJSC are published in full and available for download.