XADO

IE A007 | CASE SERIES | POWER GENERATION | BEARINGS · DRAUGHT MACHINES

**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 stamp

| 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/s²** | **18.4 m/s²** |
| Fan VGD 5B | Motor front support, vibration acceleration (axial) | **29.8 m/s²** | **11.9 m/s²** |
| Fan VGD 5B | Motor rear support, vibration acceleration (vertical) | **14.1 m/s²** | **4.94 m/s²** |
| 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 stamp of TETs-3 CJSC are published in full and available for download.