

OJSC STOYLENSKY GOK · REPORT OF 21.01.2011

Compressor 4VM10-100/9: less power and vibration without unit teardown

OJSC Stoylensky GOK, power shop and compressor station · approved by: chief power engineer G. P. Androsoy · measurements: head of the power shop, head of the boiler section, compressor station foreman

Belgorod Region, Russia · treatment 22.12.2010 – 20.01.2011 · report of 21.01.2011

PRODUCT

XADO revitalizant
compounds
full treatment cycle of the
compressor oil system

TREATED UNIT

Reciprocating
opposed-piston air
compressor 4VM10-100/9
serial no. 56 · compressor
station of the plant

DOCUMENT TYPE

Company report
with signatures and seal

EQUIPMENT

Reciprocating opposed-piston air
compressor 4VM10-100/9, serial
no. 56

DUTY AND RUNNING TIME

Regular service; "after"
measurements taken after
677 h of operation from the
start of treatment

WHAT WAS MEASURED

Power consumption, oil pressure and
temperature, vibration at six control
points

The oil system was treated on the running compressor from 22.12.2010 to 20.01.2011, without taking the unit out of service.

Key results

↓ **3.0 %**

power consumption in unloaded mode, 467.12 → 455.11
kW

↓ **26-37 %**

vibration displacement on housing and base, 9.0-83.3
→ 6.4-64.2 μm

Compressor operating parameters

PARAMETER	BEFORE TREATMENT	AFTER TREATMENT	CHANGE
Power consumption, unloaded mode	467.12 kW	455.11 kW	-12.01 kW
Oil pressure in the lubrication system	3.6 kgf/cm ²	3.6 kgf/cm ²	no change
Oil temperature	52.4 °C	52.3 °C	-0.1 °C

Measured with an electronic electricity meter at a rotor current of 220 A, 132 h after the scheduled oil change. According to the report's conclusions, the average reduction is 3.0 %.

Vibration at control points: housing (No. 1–No. 4) and base (No. 5–No. 6)

POINT	DIRECTION	VIBRATION ACCELERATION, m/s ²	VIBRATION VELOCITY, mm/s	VIBRATION DISPLACEMENT, µm
No. 1	vertical	4.21 → 2.49	1.81 → 1.00	9.00 → 6.41
No. 1	horizontal	4.92 → 4.17	4.80 → 3.22	83.3 → 64.2
No. 1	axial	3.55 → 3.20	1.87 → 0.91	15.9 → 8.47
No. 2	vertical	2.65 → 1.77	1.75 → 0.94	9.54 → 6.75
No. 2	horizontal	4.81 → 3.21	1.38 → 2.79	60.7 → 45.5
No. 2	axial	4.73 → 2.18	1.77 → 0.907	13.1 → 8.67
No. 3	vertical	4.17 → 2.53	2.01 → 1.28	15.2 → 13.4
No. 3	horizontal	5.89 → 4.52	3.56 → 2.77	78.2 → 55.9
No. 4	vertical	4.12 → 2.08	1.96 → 1.03	16.6 → 11.2
No. 4	horizontal	4.57 → 4.42	1.08 → 2.51	71.6 → 44.0
No. 5	vertical	3.15 → 1.85	1.93 → 0.975	16.7 → 12.4
No. 5	horizontal	3.93 → 2.15	3.07 → 2.18	65.8 → 42.6
No. 6	vertical	3.29 → 1.17	1.63 → 0.586	11.50 → 7.19
No. 6	horizontal	3.15 → 2.03	2.36 → 1.43	45.5 → 26.8

Vibrometer "Sendig – 911". Vibration displacement decreased in all 14 measurements, vibration acceleration also in all 14.

Report conclusions

The commission of OJSC Stoylensky GOK, together with XADO specialists, recorded the following: as a result of a full treatment cycle using XADO technology on the reciprocating opposed-piston compressor 4VM10-100/9, serial no. 56, operated at the compressor station, power consumption in unloaded mode decreased by an average of **3.0 %**. At most control points on the compressor housing the vibration level decreased, which indicates the formation of optimal thermal clearances in the cylinder-piston and crank-connecting rod assemblies of the compressor. Optimization of thermal clearances contributes to an increase in the compressor service life. The treatment was carried out from 22 December 2010 to 20 January 2011 on the running compressor, and repeat measurements were taken after **677 hours** of operation.



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The results apply to the reciprocating opposed-piston air compressor 4VM10-100/9 under the conditions of the compressor station of OJSC Stoylensky GOK; on other equipment and in other operating modes the figures may differ. The original report of 21.01.2011 with signatures and seal is published in full and available for download.