

TWO ZUEVSKAYA TPP REPORTS · FEBRUARY–MARCH 2001

Compressor 402VP4/220: higher output, lower current

Zuevskaya Thermal Power Plant, Donbassenergo JSC · reports approved by the plant chief engineer; measurements by the plant commission (central repair shop, repair planning department, process engineer)

Zugres, Donetsk region, Ukraine · treatments 15.02–26.02.2001 and 06.03–13.03.2001 · confirmed after 200 and 152 h of operation

PRODUCT

XADO technology
XADO material, compositions
applied in sequence; treatment
while the compressor is
running, without disassembly

TEST OBJECT

Reciprocating compressors
402VP4/220
five-stage, high pressure up to
200 kgf/cm² · air supply to the
plant purification unit

DOCUMENT TYPE

Two Zuevskaya TPP
reports
with commission
signatures and stamp

COMPRESSOR	TREATMENT	CONFIRMATION	WHAT WAS MEASURED
402VP4/220, February 2001 report	15.02 – 26.02.2001	after 200 h of continuous running	output, current, pressure and temperature by stage, stage V cylinder clearances, oil consumption
402VP4/220, No.3, report of 13.03.2001	06.03 – 13.03.2001	after 152 h of running	output, current, pressure and temperature by stage

Both reports cover compressors of the same type at the same plant; the February and March 2001 works were documented as separate commission reports.

What was repeated in both tests

↓ **16-19 %**

absorber filling time 0-200 kgf/cm²,
11:10-11:50 → 9:20-9:37 min:s

↓ **6.9-10 %**

motor current at 200 kgf/cm², 145-150
→ 135 A

↓ 17.9-24 %

air temperature at stage V, 117-125 →
95-96 °C

Output: filling time of the purification unit absorbers

PRESSURE RANGE	FEB REPORT · BEFORE	FEB REPORT · AFTER	MAR REPORT, No.3 · BEFORE	MAR REPORT, No.3 · AFTER
0 → 100 kgf/cm ²	6:15	5:00	6:25	5:12
100 → 150 kgf/cm ²	2:25	2:10	2:45	2:15
150 → 200 kgf/cm ²	2:30	2:10	2:40	2:10
0 → 200 kgf/cm ² , total	11:10	9:20	11:50	9:37

Filling of the purification unit absorbers is the working measure of compressor delivery: time in min:s, the shorter it is, the higher the output.

Current draw and air temperature by stage

PARAMETER	FEB REPORT · BEFORE	FEB REPORT · AFTER	MAR REPORT, No.3 · BEFORE	MAR REPORT, No.3 · AFTER
Motor current, A	150	135	145	135
Air temperature, stage I, °C	104	97	110	110
Air temperature, stage II, °C	144	140	175	172
Air temperature, stage III, °C	131	124	108	100
Air temperature, stage IV, °C	138	124	72	63
Air temperature, stage V, °C	117	96	125	95

Current was measured at a discharge pressure of 200 kgf/cm²; the reading after treatment was taken at the same parameters.

Why output rose: stage V cylinder clearances (February report)

STAGE V CYLINDER MATING PAIR	BEFORE	AFTER	FACTORY TOLERANCE
Piston – liner	0.35 mm	0.15 mm	0.16 mm
Liner – crosshead	0.25 mm	0.15 mm	0.16 mm

The stage V cylinder is the most heavily loaded stage of the compressor; the commission attributed the reduced clearances to a metal-ceramic layer build-up of 0.2 and 0.1 mm.

Conclusions of the plant commission

In the conclusions to the February 2001 report the Zuevskaya TPP commission stated: «The main compressor parameters improved across all indicators» — output increased by **20.6%**, current draw decreased by **11.1%**, oil consumption fell by **24%**, pressure rose and air temperature by stage dropped. The stage V cylinder clearances were reduced: piston–liner from **0.35 mm** to **0.15 mm**, liner–crosshead from **0.25 mm** to **0.15 mm**; the restored geometry is exactly why the absorbers fill faster and the current falls. «XADO technology made it possible to restore serviceability while the unit stayed in operation, without replacing worn-out assemblies and parts of the machine and without additional expenditure on repair work». The report of 13.03.2001 confirmed the effectiveness of the treatment on the same parameters after **152 h** of compressor operation.

XADO

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The results relate to 402VP4/220 high-pressure reciprocating compressors within the air purification unit of Zuevskaya TPP; on other machines and duty conditions the figures may differ. The original reports with signatures and stamps are published in full and available for download.