

IN-SERVICE TRIALS · 18.05—29.07.2009

Screw compressors 05-K: support vibration reduced with no teardown, on all machines

Kharkiv Yeast Plant JSC, compressor station · reports approved by the plant's chief heat engineer V. V. Dubovik

Kharkiv, Ukraine · treatment cycle 18.05—29.07.2009 · reports dated 29.07.2009

PRODUCT

XADO revitalizant gel
staged dosing into the oil bath
of a running compressor

TEST OBJECT

Screw air compressors
05-K-610 · 05-K-620 No. 1 ·
05-K-621 No. 2

DOCUMENT TYPE

Three plant technical
reports dated 29.07.2009

COMPRESSOR	RUN TIME TO MEASUREMENT	WHAT WAS MEASURED	REPORT
05-K-610	611 h	Vibration of supports and bearing assemblies, 6 points	29.07.2009
05-K-620 No. 1	1084 h	Vibration of supports and bearing assemblies, 6 points	29.07.2009
05-K-621 No. 2	1016 h	Vibration of supports and bearing assemblies, 6 points	29.07.2009

The same assembly was treated on all three machines — the oil system, the bearing assemblies of the driving and driven rotors, the base supports. The compressors were not opened.

Key result

↓ **12-18 %**

vibration level at the rotor bearing assemblies and the base supports

Vibration velocity at the control points, mm/s — before and after treatment

MEASUREMENT POINT	05-K-610	05-K-620 No. 1	05-K-621 No. 2
Front bearing of the driven rotor	6.41-8.75 → 4.21-7.11	9.02-9.4 → 3.91-6.8	5.61-7.54 → 3.8-6.15
Front bearing of the driving rotor	5.39-7.75 → 4.23-6.93	7.48-12.29 → 4.58-9.74	6.64-6.74 → 3.77-5.23
Rear bearing of the driven rotor	8.28-9.45 → 3.2-5.05	8.48-9.14 → 3.85-7.5	9.77-11.4 → 5.23-6.83
Rear bearing of the driving rotor	7.88-11.32 → 3.27-5.94	7.96-11.42 → 4.29-9.93	6.55-16.4 → 3.65-5.8
Base support, front	9.35-34.5 → 6.67-18.9	10.1-13.91 → 3.77-7.66	9.49-11.4 → 4.9-6.65
Base support, rear	7.84-23.3 → 6.39-21.0	12.12-17.9 → 4.54-4.9	8.01-11.68 → 4.06-6.01

The commissions set the final reduction at 12-18 %: before treatment the compressors were measured at no load, after treatment under full working load.

Vibration displacement at the same points, μm — before and after treatment

MEASUREMENT POINT	05-K-610	05-K-620 No. 1	05-K-621 No. 2
Front bearing of the driven rotor	23.0-75.7 → 17.2-55.8	28.8-58.4 → 23.3-48.2	48.2-64.9 → 25.5-60.1
Front bearing of the driving rotor	32.1-41.7 → 24.8-38.7	27.2-92.9 → 19.8-33.7	45.8-54.3 → 33.6-35.4
Rear bearing of the driven rotor	44.9-76.0 → 21.7-40.0	40.9-74.6 → 18.3-46.2	48.4-96.3 → 35.4-51.0
Rear bearing of the driving rotor	42.7-54.5 → 41.5-45.1	51.5-64.0 → 25.0-49.4	48.4-93.1 → 42.2-71.7
Base support, front	55.0-132.0 → 50.2-111.0	51.8-58.0 → 39.1-55.1	43.2-86.4 → 31.4-51.4
Base support, rear	52.4-95.3 → 27.0-90.3	62.4-87.7 → 28.0-51.5	56.6-131.0 → 30.0-54.9

SENDIG 911 vibrometer; three measurement directions at each point, the cells give the spread across them.

Findings of the plant commissions

The commissions of Kharkiv Yeast Plant JSC recorded the same finding for each of the three compressors: "As a result of treating the screw compressor with XADO revitalizant compounds, the vibration level at the control points of the compressor housing decreased." The average over the measurement tables is 20 % on 05-K-610 and 25 % on the other two machines; given that before treatment the compressors were measured at no load and after treatment under full working load, the commissions set the actual reduction at 12-14 % and 16-18 %. The closing statement is common to all three reports: "The reduction of the vibration level indicates the restoration of optimal clearances in the compressor bearings and will make it possible to extend the compressor service life" — by at least 1.5× on the first machine and 2× on the other two. Not a single compressor was opened: the revitalizant gel was dosed into the oil bath in stages, and the machines stayed in operation.



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The results relate to the 05-K screw air compressors of the compressor station of Kharkiv Yeast Plant JSC; on other equipment and under different operating conditions the figures may differ. The originals of the three signed reports dated 29.07.2009 are published in full and available for download.