



WORK ACCEPTANCE CERTIFICATE OF 20 AUGUST 2001

SKF and NSK 23228 bearings of a paper machine restored without replacement

Papirus JV LLP — equipment operator · work performed by GAYER LLP, distributor of the XADO corporation · certificate approved by the directors of both parties, signed by the chief engineer, the head of the engineering department and the head of the power and mechanical department of the customer
Kazakhstan · 20 August 2001 · annex No. 4 to contract No. 03/XADO of 06.08.2001

WORK	OBJECT OF WORK	DOCUMENT TYPE
Repair and restoration work using XADO technology Bearings treated and returned to the working assembly without replacement with new ones	Bearing assemblies of the press roll Spherical double-row roller bearings SKF 23228 CCK/C3 W33 (Sweden) · NSK 23228 E4 C3 (Japan)	Work acceptance certificate of the customer and the contractor Signatures of six officials, seals of both organisations

ASSEMBLY	CONDITION BEFORE THE WORK	WHAT WAS MEASURED
Bearing SKF 23228 CCK/C3 W33 (Sweden), press roll of the paper machine	Traces of rust and pitting on the working surfaces of the rollers; run-out out of tolerance on all parameters	Axial run-out, radial run-out of two cages, condition of the surfaces
Bearing NSK 23228 E4 C3 (Japan), the same press roll	Traces of rust and pitting on the working surfaces of the rollers; run-out out of tolerance on all parameters	Axial run-out, radial run-out of two cages, condition of the surfaces

Duration of the repair and restoration work using XADO technology — 150 hours.

Key results

↓ **12-20×**

radial run-out of the cages, 0.12-0.20 → 0.01 mm

↓ **50-57 %**

axial run-out of the bearings, 2.0-3.5 → 1.0-1.5 mm

Bearing run-out before and after the work

PARAMETER, mm	SKF 23228, BEFORE	SKF 23228, AFTER	NSK 23228, BEFORE	NSK 23228, AFTER	PERMISSIBLE
Axial run-out	3.5	1.5	2.0	1.0	0.5
Radial run-out, 1st cage	0.15	0.01	0.12	0.01	0.02
Radial run-out, 2nd cage	0.20	0.01	0.12	0.01	0.02

Permissible values are taken from the table of the certificate. Before the work both bearings were out of tolerance on all parameters; afterwards the radial run-out of all four cages was half the permissible limit.

Condition of the working surfaces

INSPECTION AREA	BEFORE TREATMENT	AFTER TREATMENT
Rollers	Traces of rust and pitting	No traces of rust or pitting; the surface is smooth and even
Inner parts of the bearing working surface	Traces of rust and pitting	No traces of rust or pitting

Inspection of the working surfaces before and after the work. The bearings were installed in the working assembly without replacement with new ones.

Conclusion of the certificate

Before the work both bearings of the press roll were out of tolerance on all measured parameters, with traces of rust and pitting on the working surfaces of the rollers. The commission of the customer and the contractor recorded in the certificate: «As a result of the repair and restoration work, the axial run-out of the bearings decreased significantly from **3.5 mm** to **1.5 mm** on the Swedish-made bearing and from **2.0 mm** to **1.0 mm** on the Japanese-made bearing»; «On the working surfaces of the rollers there are no traces of rust or pitting, which had been observed earlier. The surface of the rollers is smooth and even»; «The restoration of the geometric dimensions of the bearings led to reduced heating of the bearing assemblies and to a longer service life of these bearings». The bearings were treated with lubricants and installed in the working assembly for further operation.



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The results refer to the spherical double-row roller bearings SKF 23228 CCK/C3 W33 and NSK 23228 E4 C3 of the press roll of a paper machine; on other equipment and under different conditions the figures may differ. The original certificate of 20.08.2001 with the signatures and seals of the parties is published in full and available for download.