TEST-BENCH TRIAL REPORT, NII GIDROPRIVOD JSC

Hydraulic motor 410.56: less friction and leakage with no machine teardown

Research and Design Institute of Industrial Hydraulic Drives and Hydraulic Automation JSC — "NII Gidroprivod" · approved by: Deputy Director for R&D;, PhD (Eng.) G. A. Avrunin

Kharkiv, Ukraine · trials 23.05–30.05.2001, operating time 28.2 h · report approved 25.09.2001

PRODUCT

XADO technology®

"XADO compound" — the wording of the 2001 original; added to the working fluid of the test bench hydraulic system

TEST OBJECT

Hydraulic motor 410.56

axial-piston, connecting-rod kinematics, face-type distribution · displacement 56 cm³ · Stroygidravlika OJSC, Odesa

DOCUMENT TYPE

Trial report of NII Gidroprivod JSC

five signatories, stamps of the institute and of XADO LLC

TEST OBJECT	CONDITION BEFORE TREATMENT	WHAT WAS MEASURED
Hydraulic motor 410.56, displacement **56 cm³**	Run in before the compound was added, readings stable; scuffing marks and scratches on the distributor surface	Pressure drop between inlet and outlet, external leakage of the working fluid

Performance criteria per the institute's procedure: pressure drop at a fixed outlet pressure and external leakage at a fixed working-fluid temperature.

Key results

↓ 3.4×

pressure drop across the hydraulic motor, 12 → 3.5 kgf/cm²

↓ 26 %

external leakage of the working fluid, 500 → 370 cm³/min

Pressure drop between hydraulic motor inlet and outlet — by operating time

Operating time	Date of measurement	Inlet pressure P1	Pressure drop ΔP
0 h	23.05.2001	**62 kgf/cm²**	**12 kgf/cm²**
4.6 h	24.05.2001	**58 kgf/cm²**	**8 kgf/cm²**
11.1 h	25.05.2001	**55 kgf/cm²**	**5 kgf/cm²**
16.2 h	28.05.2001	**54 kgf/cm²**	**4 kgf/cm²**
22.4 h	29.05.2001	**53.5 kgf/cm²**	**3.5 kgf/cm²**
28.2 h	30.05.2001	**53.5 kgf/cm²**	**3.5 kgf/cm²**

Outlet pressure P2 was 50 kgf/cm² in every measurement, rotation speed 110-118 rpm, readings taken at the morning start-up; pressure gauges of accuracy class 1.6.

External leakage of the working fluid at 60 °C

Measurement	Date and time	Leakage Q
First	23.05.2001, 11:23	**500 cm³/min**
Last	28.05.2001, 9:55	**370 cm³/min**

18 measurements over the working days of 23.05-28.05.2001 at a fixed working-fluid temperature of 60 °C.

Conclusion of the institute

Following the bench trials, NII Gidroprivod JSC recorded: "The measurement results indicate a reduction of the pressure drop by **71%** (from **12 kgf/cm²** to **3.5 kgf/cm²**). Leakage decreased by **26%** (from **500 cm³/min** to **370 cm³/min**)". The effect of XADO technology on the hydraulic motor is confirmed by the reduced leakage of working fluid and the reduced friction losses inside the mechanism; "the friction pairs of the hydraulic motor have the appearance of smooth ground surfaces; the scuffing marks and scratches found on the distributor surface during preparation for the trials are no longer observed". As a consequence of the changes described above, the volumetric efficiency of the unit and the mean time between failures increase. The institute recommends the use of XADO technology for preventive repair of hydraulic equipment and for extending intervals between overhauls.

XADO

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The results relate to the axial-piston hydraulic motor 410.56 with a displacement of 56 cm³ on the test bench of NII Gidroprivod JSC; with other machines and operating modes the figures may differ. The trials were carried out by a joint engineering team of the institute and XADO LLC. The original report with signatures and stamps is published in full and available for download.