BENCH TEST REPORT No. 213.BSI-2008

ZAZ-1102 drive shafts: life with XADO grease no lower than with OEM grease

ZAZ JSC, test centre — bench test bureau · approved by chief designer Yu. Yu. Ralchenko, signed by test centre head I. L. Deynega

Ukraine · tests January 2009 · contract No. 381/ITs-48 of 20.10.2008

PRODUCT

XADO greases Sh1 and Sh2

XADO – Technology LLC · 80 g packed into the outer joint, 100 g into the inner one

TEST OBJECT

Drive shafts 1102-2303065-04

Driving wheel drive of ZAZ-1102 and ZAZ-1103 · 4 shafts by GLO S.p.A, Italy · 8 joints: outer and inner (tripods)

DOCUMENT TYPE

Bench test report of the ZAZ JSC test centre

DRIVE SHAFT 1102-2303065-04	XADO GREASE	INITIAL BACKLASH: OUTER / INNER JOINT
Shaft No. 1	Sh1 (black)	**34 / 36 arcmin**
Shaft No. 2	Sh1 (black)	**20 / 35 arcmin**
Shaft No. 3	Sh2 (light beige)	**22 / 34 arcmin**
Shaft No. 4	Sh2 (light beige)	**32 / 36 arcmin**

The ZAZ JSC limit before testing is no more than 36 arcmin: two joints went onto the rig at the upper tolerance boundary. Measured with a KO-1M optical quadrant at a torque of ±5 N·m.

Key results

↓ 20-25 %

wear of joint parts, grease Sh2 relative to Sh1

8 of 8 joints

circumferential backlash increase 14-34 arcmin against the control 15-35

Wear of working surfaces after 180 bench blocks

SHAFT · GREASE	JOINT	WEAR AND DAMAGE TO WORKING SURFACES
No. 1 · Sh1	outer	Slight scuffing on the mating surfaces of the housing, cage and inner race
No. 1 · Sh1	inner	Wear of all housing grooves up to **0.08 mm**; incipient pitting on the outer surface of all three rollers
No. 2 · Sh1	outer	Fretting corrosion on the mating surfaces of the housing and cage
No. 2 · Sh1	inner	Wear of all housing grooves up to **0.10 mm**; critical wear of one thrust ring by the needles of the tripod bearing
No. 3 · Sh2	outer	Incipient pitting on the housing grooves, area **(3-5) mm²**
No. 3 · Sh2	inner	Wear of one housing groove **0.08 mm**; incipient pitting on the roller running in it
No. 4 · Sh2	outer	Minor wear of the inner race in the central plane
No. 4 · Sh2	inner	Wear of two housing grooves up to **0.06 mm**; wear of the tripod bearing thrust rings

The other joint parts show no damage and no appreciable wear of the working surfaces. Fretting corrosion was found on one joint only, with grease Sh1.

Circumferential backlash increase over 180 bench blocks

SHAFT · GREASE	JOINT	BEFORE	AFTER	INCREASE
No. 1 · Sh1	outer	**34**	**49**	**15**
No. 1 · Sh1	inner	**36**	**58**	**22**
No. 2 · Sh1	outer	**20**	**41**	**21**
No. 2 · Sh1	inner	**35**	**69**	**34**

SHAFT · GREASE	JOINT	BEFORE	AFTER	INCREASE
No. 3 · Sh2	outer	**22**	**36**	**14**
No. 3 · Sh2	inner	**34**	**54**	**20**
No. 4 · Sh2	outer	**32**	**48**	**16**
No. 4 · Sh2	inner	**36**	**56**	**18**

All values are in arcmin. The control increase range was obtained on shafts from the same delivery batch with the original GLO S.p.A grease — **15-35 arcmin**.

Procedure requirements and the result

REQUIREMENT	RESULT AFTER 180 BLOCKS
No failure of drive shaft parts is permitted	All four shafts completed the tests in the full scope set by the programme and remained serviceable
Tightness of the joint seals	No loss of tightness was recorded during the tests
Integrity of the sealing boots	No mechanical damage and no degradation of the rubber
Condition of the grease in the tripod bearing assemblies	Grease Sh2 retained its original light beige colour

The programme is 180 blocks to procedure MET 02,020-99 on the IS 126-00.000 rig: 500 N·m at 350 rpm and 250 N·m at 700 rpm, joint angles 5° and 15°.

Conclusions of the ZAZ JSC test centre

All four drive shafts completed the durability tests in the full scope set by the programme and remained serviceable.

1. Greases Sh1 and Sh2 produced by XADO – Technology LLC ensure the durability of drive shafts 1102-2303065-04 made by GLO S.p.A in accordance with the standards adopted at ZAZ JSC.
2. The wear-induced increases in circumferential backlash in the joints of shafts assembled with greases Sh1 and Sh2 are no greater than in joints with the original greases used by GLO S.p.A.
3. Grease Sh2 is preferable to grease Sh1, as it prevents fretting corrosion and reduces wear of the joint parts by **(20...25) %**.

XADO

The results relate to drive shafts 1102-2303065-04 of the driving wheel drive of ZAZ-1102 and ZAZ-1103 and to the conditions of bench testing under procedure MET 02,020-99; under other conditions the figures may differ. The original report is published in full and available for download.