

## **XADO - Applications for Industrial Equipment**

The XADO technology treatment of the operable industrial equipment is carried out in a regular operation mode by introducing XADO gel-revitalizants into the oil system or by replacing a regular grease by XADO grease.

- Restoration of the initial geometry of the friction pairs;
- Reliable protection from wear for 9 months at any operation mode;
- Energy saving – from 5% up to 25%
- Reduction of the vibration level by 5 times;
- Increase of the resource by 1,5 to 3 times;
- Payback period for XADO-materials is from 15 days to 7 months due to energy saving.

### **Main groups of equipments covered:**

1. Engines
2. Compressors
3. Gears
4. Hydraulic systems
5. Bearings
6. Machines
7. Presses

### **1. Engines**

#### **Oil system**

#### **Benefits of revitalization:**

- elimination of ovality and taper on the operating surface of the cylinders up to 0,15 mm;
- complete removal of scratches and microgaps of up to 0,03 mm depth on the operating surface of the cylinders;
- reliable protection from wear for 9 months at any operation mode;
- equalization and increase of compression, as well as maximal combustion pressure in the cylinders;
- fuel economy up to 18%;
- increase of engine power;
- possibility of engine operation up to 300 km in case of accidental oil leakage;
- decrease of CO and HC in exhaust gases by 2 to 10 times;
- extension of life span by 1,5 - 2,5 times.

#### **Application instructions:**

- Diesel engines with oil system capacity over 30 liters are treated with “XADO gel-revitalizant for diesel engines” in three stages, at the rate 0,9 ml per 1 liter of regular oil for one stage of treatment.
- Diesel or gasoline engines with oil system capacity up to 30 liters are treated with “XADO gel-revitalizant for diesel engines” or with “XADO gel-revitalizant for gasoline engines” (for each type of engines respectively) in three stages according to the following table:

Oil system capacity, l.	Number of tubes (9,0 ml) or aerosol cans (10,0 ml) of gel-revitalizant for diesel/gasoline engine	Treatment scheme
3-10	3	1+1+1
11-20	6	2+2+2
21-30	9	3+3+3

- Accumulative operating time between stages is 8 - 12 hours or 150 - 250 km run.
- Treatment cycle is completed after no less than 400 hours of the mechanism operation (about 1.500 km run) from the beginning of the first stage of treatment.

### **Fuel system of diesel engines**

#### **Benefits of revitalization**

- elimination of wear in the pump elements up to 0,003 mm;
- reliable protection of high pressure fuel pump from low-quality fuel;
- improvement of spray pattern;
- increase of pressure and cyclic fuel delivery into the cylinders;
- reduction of fuel consumption up to 7%;
- decrease of CO and HC in exhaust gases by 2 to 10 times;
- extension of life span of high pressure fuel pump by 2 - 3 times.

#### **Application instructions**

- Treatment of fuel systems is carried out with "XADO gel - revitalizant for fuel equipment" (for each, diesel and gasoline engines, respectively) in one stage by introducing the necessary amount of gel into the fuel according to Table 1.
- Treatment cycle is completed after no less than 80 hours of the mechanism operation (4.000 km run).

Table 1.

Engine cubic capacity, l.	Number of tubes (9,0 ml) or aerosol cans (10,0 ml) of XADO gel-revitalizant for high pressure fuel pumps per fuel tank
up to 5	1
5 - 15	2
15 - 30	3
30 - 75	4
75 - 100	5
100 - 140	6
140 - 175	7
175 - 200	8
200 - 225	9
225 - 260	10
260 - 300	11

## **2. Compressors**

### **Benefits of revitalization:**

- elimination of cylinders ovality and bore taper in reciprocating compressors up to 0,5 mm;
- elimination of crankshaft pin ovality in reciprocating compressors up to 0,05 mm;
- complete removal of scratches, cavities and microgaps of up to 0,04 mm depth on the working surface of the cylinders in reciprocating compressors;
- increase of reciprocating compressors efficiency up to 25%;
- increase of pressure and stabilization of oil operating temperature;
- reduction of power consumption in reciprocating compressors up to 36%;
- maintenance of improved operating parameters of compressors for 9 months after treatment at any operating time;
- increase of compressors resource by 2 - 2,5 times.

### **Application instructions:**

- Reciprocating (centrifugal) compressors are treated with "XADO industrial gel-revitalizant for compressors and bearings" in 3 (or 5) stages at the rate of 2,0 (respective 0,8) ml per 1 liter of regular oil for one stage of treatment.
- Screw compressors with lubricating system without oil pump are treated with "XADO industrial gel-revitalizant for power steering pumps" in 8 stages at the rate of 0,5 ml per 1 liter of regular oil for one stage of treatment.
- Accumulative operating time between stages is 12 - 24 hours.
- Treatment cycle is completed after no less than 400 - 550 hours of the compressor operation from the beginning of the first stage of treatment.

## **3. Gears**

### **Benefits of revitalization:**

- wear compensation through the teeth thickness of gear wheels up to 0,8 mm;
- lower roughness and higher micro-hardness up to 750 kg/mm<sup>2</sup> on teeth contact patches;
- elimination of pitting cavities, scratches, micro-gaps of up to 0,1 mm depth on teeth contact patches;
- decrease of contact pressure on teeth contact patches by 2 - 4 times;
- reduction of radial clearances in bearings up to 0,07 mm;
- increase of the resource by 2 - 3 times.

### **Application instructions:**

- Gear boxes and transfer cases are treated with "XADO gel-revitalizant for gear boxes, transfer cases and differentials" without oil change, in 3 stages, at the rate of 3.0 ml per 1 l of regular oil for one stage of treatment.
- Gears, operating with the elements of hydraulic systems in the same oil bath, are treated with "XADO industrial gel-revitalizant for power steering pumps" in 5 stages, at the rate of 1,8 ml per 1 l of regular oil for one stage of treatment.
- Accumulative operating time between stages is 12 - 24 hours.
- Treatment cycle is completed after no less than 450 hours of full operating time, from the first stage of treatment.

## **4. Hydraulic systems**

### **Benefits of revitalization:**

- increase of pressure and pump performance;
- elimination of the hydraulic valves overflow;
- increase of operating pressure in the hydraulic system by 8% - 20%;
- increase of performance index of the hydraulic motors;
- extension of service life of the positive-displacement hydraulic machines by 1,5 - 2 times.

### **Application instruction:**

- Hydraulic systems of industrial equipment are treated by adding "XADO industrial gel-revitalizant for power steering pumps" into hydraulic fluid in 6 stages, at the rate of 0,6 ml of gel per 1 liter of operating fluid for one stage of treatment.
- Accumulative operating time between stages is 12 - 18 hours.
- Treatment is completed after 550 hours of the hydraulic system operation, from the beginning of the first stage of treatment.

## **5. Bearings**

### **Benefits of revitalization:**

- elimination of radial clearances up to 0,07 mm, as well as the axial play up to 0,03 mm;
- increase of the bearings accuracy class;
- decrease of vibration velocity by 1,5 - 2,5 times and displacement by 25 - 40%;
- increase of the rolling bearings run-out by up to 30 - 70%;
- extension of the life span by 2 - 4 times.

### **Application instructions:**

- Rolling bearings in the oil bath are treated with "XADO industrial gel-revitalizant for compressors and bearings" without oil change, in 3 stages, at the rate of 1,2 ml of gel per 1 liter of regular oil for one stage of treatment.
- Friction bearings are treated with "XADO industrial gel-revitalizant for compressors and bearings" in 6 stages, at the rate of 1,5 ml of gel per 1 liter of regular oil for one stage of treatment.
- Accumulative operating time between stages is 20 - 30 hours.
- Treatment cycle is completed after no less than 550 hours of the bearings operation, from the beginning of the first stage of treatment.

## **6. Machines**

### **Benefits of revitalization:**

- decrease of the spindle radial clearances up to 0,04 mm;
- reduction of the spindle radial run-out up to 0,03mm, as well as face run-out up to 0,02 mm;
- lower surface roughness of the operating parts up to Ra 0,01;
- stabilization of the hydraulic systems operation;
- reduction of noise and vibration from 20% up to 70%;
- extension of life span of the machine units and mechanisms by 1,5 - 2 times.

### **Application instructions:**

#### **Spindle assemblies, gear boxes, power mechanisms:**

- Spindle assemblies, gear boxes (with mixed lubrication system), mechanism of grinding and control wheel head, mechanism of cartridge wheel head and spindle of internal grinding machine, operating in the oil bath, are treated with "XADO industrial gel-revitalizant for compressors and bearings" in 3 stages, at the application rate of 3,0 ml of gel per 1 liter of regular oil for one stage of treatment.
- Gear boxes and transfer cases, as well as bearings of the milling machine cantilever with separate lubrication system, are treated with "XADO industrial gel-revitalizant for gearboxes, transfer cases and differentials" in 3 stages, at the application rate of 3,0 ml of gel per 1 liter of regular oil for one stage of treatment.
- Spindle bearings of grinding wheel heads of the circular grinding machine, operating in the oil bath, are treated with "XADO industrial gel-revitalizant for compressors and bearings" in 6 stages, at the application rate of 1,5 ml of gel per 1 liter of regular oil for one stage of treatment.

- Spindle assemblies of the coordinate boring machines are treated with "XADO industrial gel-revitalizant for power steering pumps" in 5 stages, at the application rate of 0,8 ml of gel per 1 liter of regular oil for one stage of treatment.
- Accumulative operating time between stages is 8 - 12 hours.
- Treatment of assemblies is completed after no less than 450 hours of full operating time, from the beginning of the first stage.

#### **Machine lead screws**

- Treatment of the lead screws lubricated with oil is carried out by introducing "XADO industrial gel-revitalizant for gear boxes, transfer cases and differentials" into the lubricating oil of a screw pair at the rate of 9,0 ml of gel per 1 liter of regular oil.
- Treatment cycle is completed after no less than 550 hours of the mechanism operation.

#### **Machine ways**

- Machine ways are treated with "XADO industrial gel-revitalizant for compressors and bearings" by introducing the necessary amount of gel into the oil bath, at the rate of 9,0 ml per 1 liter of regular oil for the complete treatment cycle.
- Treatment of the ways is completed after no less than 700 hours of the machine operation.

#### **Machine hydraulics**

- See Hydraulic system

### **7. Presses**

#### **Benefits of revitalization:**

- reduction of ovality and taper in compressor cylinders and main motion of pneumatic hammers up to 0,15 mm;
- reduction of gaps and elimination of micro-wear of the hammer, press and punch guide ways;
- stabilization of the hydraulics operation;
- increase of the resource by 1,5 - 2 times.

#### **Application instructions:**

#### **Compressors of pneumatic hammers**

- Compressors of the pneumatic hammers are treated with "XADO industrial gel-revitalizant for compressors and bearings" without oil change, in 3 stages, at the rate of 1,5 ml per 1 liter of regular oil for one stage of treatment.
- Accumulative operating time between stages is 8 - 12 hours.
- Treatment is completed after no less than 450 hours of the compressor operation from the first stage of treatment.

#### **Main motion cylinders of hammers**

- Treatment of the main motion cylinders of hammers is carried out by adding "XADO industrial gel-revitalizant for compressors and bearings" into the lubricating system of a piston-cylinder group, in 3 stages, at the rate of 1,5 ml of gel per 1 liter of grease oil for one stage of treatment.
- Accumulative operating time between stages is 8 - 12 hours.
- Treatment cycle of the main motion cylinder is completed after no less than 450 hours of the hammer operation from the beginning of the first stage.

#### **Hydraulic system of hydraulic hammers and presses**

- See Hydraulic system

#### **Guide ways of hammers, presses and punches**

- Guide ways of hammers, presses and punches are treated with "XADO industrial gel-revitalizant for compressors and bearings" by introducing the necessary amount of gel into the oil bath, at the rate of 9,0 ml per 1 liter of regular oil for the complete treatment cycle.
- Treatment of guide ways is completed after no less than 700 hours of the machine operation.