

**Passport № \_\_\_\_\_**  
**XADO® technology treatment**  
**results of the unit**

Date: « \_\_\_\_ » \_\_\_\_\_ 2003

Customer: \_\_\_\_\_ Main Locomotive Department of "Ukrzaliznytsa"  
 Contractor: \_\_\_\_\_ LLC "XADO"

## Unit:

- Type \_\_\_\_\_ Diesel locomotive  
 - Model \_\_\_\_\_ 2ТЭ10УТ (section A)  
 - Factory number \_\_\_\_\_ 0036  
 - Year of manufacturing \_\_\_\_\_ 20.06.1991  
 - Manufacturer \_\_\_\_\_ Luganskiy diesel-locomotive-building works  
 - Date of last overhaul \_\_\_\_\_ July, 2002, TP-3  
 - Home depot \_\_\_\_\_ T. G. Shevchenko depot, Odesskaya Railway  
 - Mileage of the unit after XADO® technology treatment \_\_\_\_\_ 114014 km

## Units subject to XADO® technology treatment

| Item | Description                      | Factory number | Type of basic lubrication | Amount of lubrication, l | System of lubrication | Notes |
|------|----------------------------------|----------------|---------------------------|--------------------------|-----------------------|-------|
| 1    | Diesel engine 10Д100 (section A) | 1432 ФХ        | Motor oil M14B2 or M14Г2  | 1500                     | oil bath              |       |

## Data of XADO® technology treatment

| № of unit | Type of XADO-material                    | Date of treatment |               |              | Amount of XADO material for treatment, l |               |              | Total amount of XADO material, l |
|-----------|--|-------------------|---------------|--------------|--|---------------|--------------|----------------------------------|
|           |  | 1st treatment     | 2nd treatment | 3d treatment | 1st treatment                            | 2nd treatment | 3d treatment |                                  |
| 1         | Gel-revitalizant XADO for diesel engines | 13.09.02          | 14.09.02      | 15.09.02     | 2,00                                     | 2,00          | 2,27         | 6,27                             |

## Measurement results of the units before and after XADO® technology treatment:

**Measurement results of compression in cylinders of engine 10Д100 № 1432ФХ (section A)**  
**before and after XADO® technology treatment**

| Sequence number of cylinder  | 1    | 2    | 3 | 4  | 5  | 6  | 7  | 8    | 9    | 10 |
|--|------|------|---|----|----|----|----|------|------|----|
| Size of compression before XADO® technology treatment, kg/cm <sup>2</sup>                    | 26   | 27   | - | 26 | 25 | 28 | 26 | 25   | 26   | 25 |
| Size of compression after XADO® technology treatment and a 29864 km run, kg/cm <sup>2</sup>  | 29   | 30   | - | 27 | 27 | 30 | 29 | 29   | 31   | 30 |
| Size of compression after XADO® technology treatment and a 114014 km run, kg/cm <sup>2</sup> | 29,5 | 29,5 | - | 28 | 28 | 30 | 29 | 28,5 | 30,5 | 30 |

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№31233443

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Measurements of compression size before XADO® technology treatment and after a 29864 km run were performed with a compressometer №119304, verified 27.07.2002.

**Measurement results of oil pressure in engine 10Д100 № 1432ФХ (section A) at idle run before and after XADO® technology treatment**

|  |     |     |     |
|--|-----|-----|-----|
| Rotary speed of engine, rpm  | 270 | 400 | 850 |
| Oil pressure size before XADO® technology treatment, kg/cm <sup>2</sup>                    | 0,5 | 1,4 | 2,5 |
| Oil pressure size after XADO® technology treatment and a 29864 km run, kg/cm <sup>2</sup>  | 0,7 | 1,5 | 2,5 |
| Oil pressure size after XADO® technology treatment and a 114014 km run, kg/cm <sup>2</sup> | 0,5 | 1,0 | 2,3 |

Measurements of oil pressure size were performed with a regular manometer № 1, verified 21.06.2002.

**Measurement results of combustion pressure in cylinders of engine 10Д100 № 1432ФХ (section A) before and after XADO® technology treatment**

|   |     |    |    |     |    |    |     |    |    |    |
|---|-----|----|----|-----|----|----|-----|----|----|----|
| Sequence number of cylinder   | 1   | 2  | 3  | 4   | 5  | 6  | 7   | 8  | 9  | 10 |
| Combustion pressure size before XADO® technology treatment, kg/cm <sup>2</sup>                    | 95  | 97 | 95 | 96  | 97 | 97 | 97  | 96 | 95 | 95 |
| Combustion pressure size after XADO® technology treatment and a 29864 km run, kg/cm <sup>2</sup>  | 100 | 99 | -  | 99  | 98 | 99 | 100 | 98 | 97 | 99 |
| Combustion pressure size after XADO® technology treatment and a 114014 km run, kg/cm <sup>2</sup> | 97  | 95 | -  | 101 | 90 | -  | 96  | 90 | 96 | 96 |

Measurements of combustion pressure were performed with a maximeter №119304, verified 27.07.2002.

**Measurement results of fuel consumption of engine 10Д100 № 1432ФХ (section A) at idle run before and after XADO® technology treatment.**

|   |     |
|---|-----|
| Rotary speed of engine, rpm   | 850 |
| Fuel consumption size before XADO® technology treatment, l/h                    | 985 |
| Fuel consumption size after XADO® technology treatment and a 29864 km run, l/h  | 842 |
| Fuel consumption size after XADO® technology treatment and a 114014 km run, l/h | 790 |

Measurements of fuel consumption were performed with a regular measuring scale.

**Measurement results of power of engine 10Д100 № 1432ФХ (section A) at idle run before and after XADO® technology treatment.**

|  |     |      |
|--|-----|------|
| Rotary speed of engine, rpm  | 270 | 850  |
| Engine power before XADO® technology treatment, kw.                    | 60  | 1780 |
| Engine power after XADO® technology treatment and a 29864 km run, kw.  | 60  | 1850 |
| Engine power after XADO® technology treatment and a 114014 km run, kw. | 80  | 1850 |

Measurements of engine power were performed with the help of a rheostatic test bench.

**Measurement results of noise level of engine 10Д100 № 1432ФХ (section A) before and after XADO® technology treatment.**

|   |     |
|---|-----|
| Rotary speed of engine, rpm   | 850 |
| Noise level of engine before XADO® technology treatment, dbA                    | 123 |
| Noise level of engine after XADO® technology treatment and a 29864 km run, dbA  | 123 |
| Noise level of engine after XADO® technology treatment and a 114014 km run, dbA | 95  |

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Measurements of noise level were performed with a noise dosimeter 00024 № 31192.

### Conclusions:

The measurements of performance parameters of engine 10Д100 № 1432ФХ of diesel locomotive 2ТЭ10УТ №036 (section A) , performed on a regular TP-1, after a 114014 km run have revealed the following results:

- Fuel consumption at idle run has decreased by 6% compared with the measurement results, made after a 29864 km run;
- Engine power at idle run has increased by 22% compared with the measurement results, made after a 29864 km run;
- Noise level has decreased on average by 10% compared with the measurement results, made after a 29864 km run;

In comparison with the measurement results, made after a 29864 km run, the measurements of performance parameters of engine 10Д100 № 1432ФХ remain stable and show that after a 114014 km run performance parameters haven't become worse. This means that engine parts don't wear out.

The reduction of fuel consumption is maximal at idle run and low working loads. This fact can be explained: the effect of mechanical losses under such working conditions of the engine are considerable and their significant decrease makes fuel consumption lower. The increase of engine power at idle run is in proportion with the decrease of mechanical losses power. The measurement results show successful Revitalization process and confirm high efficiency of XADO-Technology application in diesel engines of railway vehicles.

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