

TEST REPORT

of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant in Mitsubishi 6D22-T diesel engine of KATO KR500S crane truck

**1. Test objective:**

Determination of the action of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant on operating parameters of Mitsubishi 6D22-T diesel engine of KATO KR500S crane truck.

2. Test objects:

2.1 Atomic metal conditioner MAXIMUM for Diesel Truck with XADO 1 STAGE revitalizant, with package volume of 960.0 ml, manufacturer XADO-Technology Ltd., 23 Avgusta lane, 4, Kharkov, Ukraine.

2.1 Mitsubishi 6D22-T turbocharged diesel engine of KATO KR500S crane truck, year of manufacture – 1989, in-line six-cylinder engine, engine displacement 11,149 cm³, oil system capacity 29.0 L, compression rate 16, engine capacity 270

horsepower; engine operating time 49,800 hours, engine complete overhaul has not been conducted, manufacturer Mitsubishi Motors, Japan.

3. Test subject:

Determination of the action of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant, added into the lubrication system of Mitsubishi 6D22-T engine of KATO KR500S crane truck, on compression rate in all engine cylinders, on the actual volume of consumed oil and degradation rate of motor oil at regular operation of crane truck.

4. Tests procedure:

Tests were conducted in the period from 16th of April to 14th of July 2013.

4.1 Before the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant into oil system of Mitsubishi 6D22-T engine the scheduled motor oil replacement with additional oil flushing of the engine lubrication system was conducted with the help of XADO VITAFUSH soft cleaner for engine oil systems. After the motor oil replacement the crane truck was operated in normal operation mode with full load during 72 hours.

4.2 During 70 operating hours of crane truck in regular operation mode the actual motor oil consumption through burning of Mitsubishi 6D22-T engine was determined by means of periodical introduction of fresh oil in oil system till maximum mark at oil gauge. The actual oil consumption for 70 operating hours of crane truck before the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant made 8.4 L or 0.12 L per hour.

4.3 After the total operating time of 72 hours of crane truck on fresh motor oil before the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant the compression rate (maximum compression pressure) measurements in all engine cylinders at temperature of the engine of 74 °C have been taken by PCSm-40 compression meter for diesel engines.

Values of measured compression rate between cylinders of Mitsubishi 6D22-T engine of crane truck KATO KR500S before the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant are set out in Table 1.

Table 1 - Compression rate in cylinders

Parameter name	Cylinders numbers in engine					
	1	2	3	4	5	6
Compression rate before treatment, bar.	23.7	25.2	24.5	24.0	24.0	22.0

4.4 At total engine operating time of 72 hours after motor oil replacement the analysis of motor oil was made with a help of TMEH 1 SKF device for express analysis of motor oil with the purpose of degradation rate determination comparing to the same fresh sample of motor oil. Before the measurements the TMEH 1 SKF device was calibrated according to the sample of the same fresh motor oil, filled into engine. For 72 operating hours of engine on fresh motor oil before the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant the degradation rate of motor oil made 43.4 units (Picture 1).



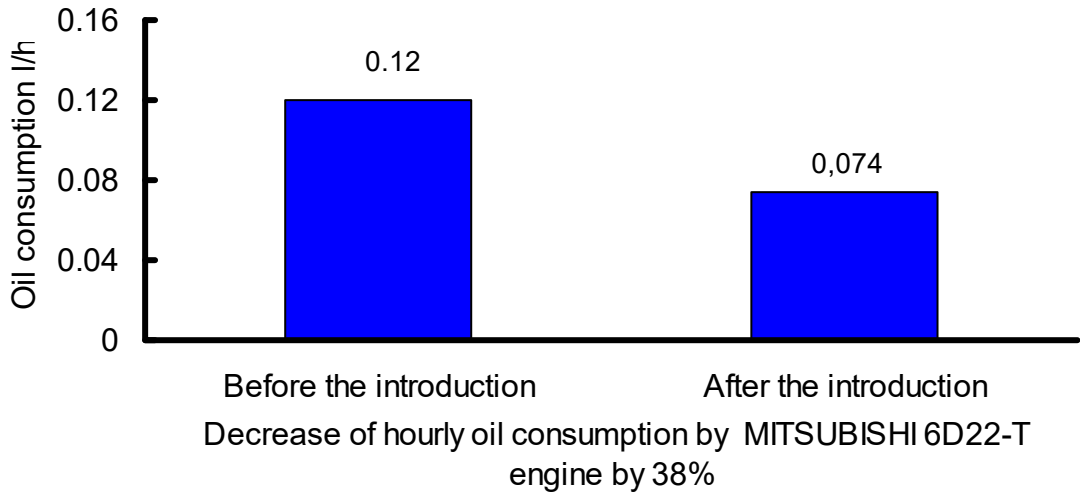
Picture 1 – TMEH1 device readings of motor oil degradation rate before the introduction of atomic metal conditioner (at operating time of 72 hours)

4.5 After the measurements 1 package of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant with volume of 950.0 ml was introduced into oil system of diesel engine according to the manufacturer's specifications for this product.

4.6 After the total operating time of crane truck in regular operating mode during 106 hours the repeated measurements of the same parameters were taken: motor oil consumption through burning during the latest 70 operating hours of crane truck; compression rate (maximum compression pressure in all cylinders); degradation rate of motor oil.

4.7 Motor oil consumption through burning made 5.2 L or 0,074 L per hour after the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant for the last 70 operating hours of crane truck. Motor oil consumption through burning has been decreased by 38% after the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant. (Picture 2).

Motor oil consumption by Mitsubishi 6D22-T engine before and after the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 Stage revitalizant



Picture 2 – Motor oil consumption by engine

4.8 The repeated measurements of compression rate between engine cylinders at temperature of 70 °C were conducted. The compression rate (maximum compression pressure) between cylinders before the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant and after the introduction and the operating time of 106 hours of engine is set out in Table 2.

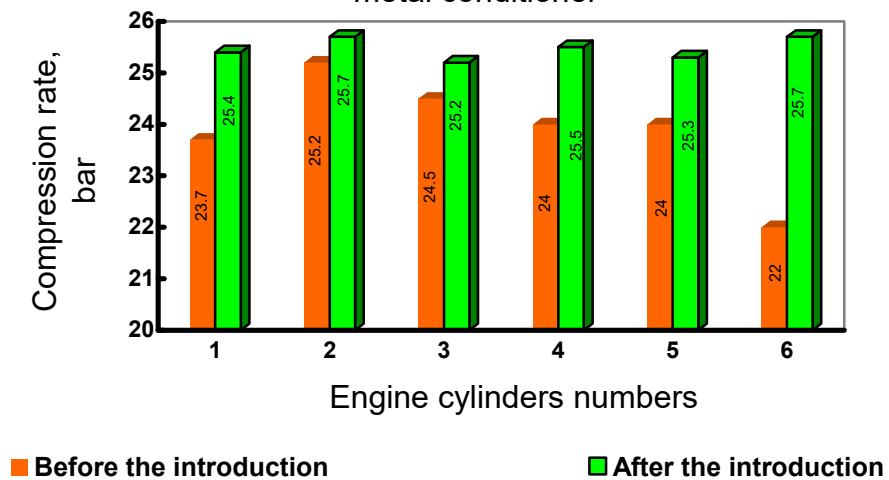
Table 2 – Compression rate in engine cylinders

Parameter name	Cylinders numbers					
	1	2	3	4	5	6
Compression rate before the treatment, bar	23.7	25.2	24.5	24.0	24.0	22.0
Compression rate after the treatment, bar	25.4	25.7	25.2	25.5	25.3	25.7

After the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant the average compression rate has increased from 23.9

bar to 25.4 bar (increase by 6%). The deviation from compression rate between cylinders has been decreased from 3.2 to 0.5 bar. The decrease of compression deviation between cylinders is by 85%.

Diagram of compression change between cylinders of Mitsubishi 6D22-Tengine engine before and after the introduction of atomic metal conditioner



Picture 3 – Diagram of compression change between cylinders

4.9 Degree of degradation of motor oil, measured after the introduction of atomic metal conditioner Maximum for Diesel Truck with XADO 1 STAGE revitalizant and the further engine operating time of 106 hours, made 47.8 units (before the introduction – 43.3), i.e. degradation of performance properties of oil is not indicated (picture 4).



Picture 4 – TMEH1 device readings of motor oil degradation rate after the introduction of atomic metal conditioner and the further operating time of 106 hours. The total oil operation oil comprised 72 hours + 106 hours, i.e. the oil with atomic metal conditioner practically hasn't changed its operational properties; if the oil worked without metal conditioner for all that time, it would lost its properties and be subject to change.

5 Conclusions:

5.1 The introduction of atomic metal conditioner MAXIMUM for Diesel Truck with XADO 1 STAGE revitalizant into the lubrication system of Mitsubishi 6D22-T turbocharged diesel engine, operated at KATO KR500S crane truck, has influenced positively on compression rate in engine cylinders. The compression in all cylinders has increased by 6%. The deviation from compression rate in cylinders made 3.2 bar before the introduction of atomic metal conditioner MAXIMUM for Diesel Truck with XADO 1 STAGE revitalizant, after introduction – 0.5 bar, the decrease of compression deviation between cylinders is 85%.

5.2 After the introduction of atomic metal conditioner MAXIMUM for Diesel Truck with XADO 1 STAGE revitalizant the motor oil consumption through burning has substantially decreased from 0.12 L/h to 0.074 L/h, the decrease made 38%.

5.3 In the result of the introduction of atomic metal conditioner MAXIMUM for Diesel Truck with XADO 1 STAGE revitalizant into the engine lubrication system the degradation rate of motor oil has sharply decreased. For 106 operating hours of crane truck in regular operating mode the degradation rate of motor oil has reduced by 4,4 units, while before the introduction of atomic metal conditioner MAXIMUM for Diesel Truck with XADO 1 STAGE revitalizant the motor oil degradation rate made 43.4 units for 72 operating hours.

5.4 The introduction of atomic metal conditioner MAXIMUM for Diesel Truck with XADO 1 STAGE revitalizant in lubrication system of medium and high capacity engines improves operating parameters of the engine: increases and levels compression rate in cylinders, consequently, engine power is increased, oil consumption through burning is substantially decreased, degradation rate of motor oil is reduced, which as the result leads to increasing of motor oil operation by 20-25%.