

TWO REPORTS BY SE "UKRVODPUT" · APRIL–JULY 2001

Marine diesels 4Ch and 6ChN: compression and oil pressure rose in service

SE "Ukrvodput", marine facilities service · treatment carried out by PKP "Serna"; the reports are signed by the line engineer-mechanic and the dredger master, approved by the deputy head of the enterprise

Ukraine · contract No. 19 of 11.04.2001 and contract No. 2 of 04.07.2001 · monitored up to 500 hours of operation

PRODUCT

XADO RVS
repair-and-restoration
compounds of the XADO
technology · treatment without
engine disassembly

OBJECTS OF THE SERIES

Two marine diesels
6ChN 18/22 on dredger DN "E.
Kolodochka" · 4Ch 8.5/11 on
"SZ-15"

DOCUMENT TYPE

Two enterprise reports
with signatures and stamps

VESSEL · ENGINE**CHECK AFTER
TREATMENT****WHAT WAS MEASURED**

dredger DN "E. Kolodochka" ·
6ChN 18/22, six cylinders

after **100** and **500 h** of
operation

compression by cylinder, oil pressure, fuel
consumption under load

"SZ-15" · 4Ch 8.5/11, four
cylinders

at the **16th hour** of
operation

compression by cylinder, cylinder bores, oil
pressure and fuel consumption at two modes

Both engines were treated in service: without disassembly and without taking the vessel out of operation. The measurements were taken on the same units.

What was repeated on both vessels

↑ **2-8.3 %**

cylinder compression, 22.6-25.5 →
26.0-31.0 kgf/cm²

↓ **11.6-15.2 %**

fuel consumption under load, 21.5 → 19.0
kg/h on the 6ChN 18/22

↑ **21-60 %**

oil pressure at working speed, 2.8 → 3.4
and 1.25 → 2.0 kgf/cm²

Cylinder compression — both vessels

VESSEL · ENGINE	BEFORE TREATMENT, kgf/cm ²	AFTER TREATMENT, kgf/cm ²	CHANGE
dredger DN "E. Kolodochka" · 6ChN 18/22	22.6-24.8, average 24.0	29.0-31.0, average 30.3	+26.4 %
"SZ-15" · 4Ch 8.5/11	24.0-25.5, average 24.8	26.0-26.5, average 26.1	+5.6 %

On the "E. Kolodochka" the check was taken after 500 hours of operation, on the "SZ-15" — at the 16th hour, against a 50-hour norm for completion of the treatment.

How the effect grew on the "E. Kolodochka" — 6ChN 18/22, all six cylinders

CYLINDER	BEFORE TREATMENT	AFTER 100 HOURS	AFTER 500 HOURS
Cylinder 1	24.3	26.0	29.0
Cylinder 2	24.0	26.0	30.0
Cylinder 3	24.3	28.0	31.0
Cylinder 4	24.8	28.0	31.0
Cylinder 5	22.6	24.0	31.0
Cylinder 6	24.0	24.0	30.0
Engine average	24.0	26.0	30.3

The values are cylinder pressures, kgf/cm². The weakest cylinder before treatment (22.6) gained the most and reached the level of the best ones.

Fuel consumption

VESSEL · MEASUREMENT MODE	BEFORE TREATMENT	AFTER TREATMENT	CHANGE
"E. Kolodochka", 750 rpm, load on the generator	21.5 kg/h	19.0 kg/h	−11.6 %
"SZ-15", 1450 rpm, load on the propeller	28 s per 50 ml	33 s per 50 ml	−15.2 %
"SZ-15", 825 rpm, no load on the propeller	157 s per 50 ml	182 s per 50 ml	−13.7 %

Consumption was taken by timing the engine on a measured portion of fuel: more time on the same portion means lower consumption.

Oil pressure in the lubrication system

VESSEL · MEASUREMENT MODE	BEFORE TREATMENT	AFTER TREATMENT	CHANGE
"E. Kolodochka", 750 rpm, oil at 65 °C	2.8	3.4	+21.4 %
"SZ-15", 1400 rpm, oil at 78 °C	1.25	2.0	+60 %
"SZ-15", 800 rpm, oil at 78 °C	0.6	1.5	2.5×

The values are kgf/cm². Both commissions additionally noted lower engine noise and vibration, better starting and throttle response.

Cylinder geometry — 4Ch 8.5/11, "SZ-15"

CYLINDER	BEFORE TREATMENT, mm	AFTER TREATMENT, mm	CHANGE
Cylinder 1	85.068	85.030	−0.038 mm
Cylinder 2	85.062	85.030	−0.032 mm
Cylinder 3	85.140	85.110	−0.030 mm
Cylinder 4	85.090	85.060	−0.030 mm

The nominal cylinder bore of the 4Ch 8.5/11 is 85 mm, as stated by the engine designation. The bore of the worn cylinders returned to nominal: a layer grew that compensated the wear.

Conclusions of the enterprise commissions

On two vessels and two diesel sizes the commissions of SE "Ukrvodput" obtained the same result. The reason is visible on the "SZ-15": the worn cylinder bores decreased by **0.030-0.038 mm** — a layer grew on the friction surfaces that compensated the wear. The rest follows the chain: the tightness of the cylinder-piston group was restored — compression rose; the clearances in the lubrication system were restored — oil pressure rose; together this gave fuel savings under load. The engines were not disassembled and ran under their own power. Conclusion on the "E. Kolodochka": "The results of applying the XADO technology for restoring marine engines in service instead of conventional restorative repair shall be considered positive." Conclusion on the "SZ-15": "The results of applying the RVS technology for restoring internal combustion engines in service allow it to be recommended for use instead of conventional restorative repair."



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The results refer to the marine diesels 6ChN 18/22 and 4Ch 8.5/11 treated in service; on other engines and under other conditions the figures may differ. RVS is an obsolete XADO designation for the zero-generation compounds; the current product generation is revitalizants. The originals of both reports, with signatures and stamps, are published in full and available for download.