

**Engine test report / ENGLISH  
TRANSLATION / DRAFT  
CLS diesel fuel additive  
VOLVO-PENTA MD-1**

Commissioned by  
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## 1) Introduction

Tests with LuBoron™ diesel additive during the spring of 2002 at the research engine laboratory-

## 2) The test setup

Volvo Penta MD1 in a test bench according to research standard setup.

## 3) The test

The engine was fully overhauled and restored and the tests were run through February and March. The initial run was performed with Volvo standard diesel fuel. After 4 hours, the real tests were performed including measurement of torque as a function of fuel consumption, HC concentration in the emission.

## 4) The result

Initial tests are indicating a 5% reduced fuel consumption. Long term benefits will be reduced wear due to reduced friction.

## 5) Conclusion

Conclusions and tendencies:

- Decreased fuel consumption, >5% for Boron CLS Bond™ diesel additive
- No Acid in used fuel
- Significant reduction of metal residues in the engine oil (When testing the CLS oil additive)
- Significant tendencies of corrosion
- Significant reduced wear
- Decreased HC emission
- Density 1.5 g/ml. Particle size < 0.2-0.5 u, therefore no risk for clogged fuel and oil filters
- Patent, patent no. 5,431,830
- All Boron CLS Bond™ products are certified at American Bureau of Shipment
- All Boron CLS Bond™ products have or has pending MIL specification. All indices points to all products will qualify
- Boron CLS Bond™ are not aggressive vs. other materials such as metals (Al) or rubber. (Common for other lubricants)
- Boron (CLS Bond™ does not USE ptfе (EX. Teflon) or ZDDP (Zn) which combined with H2O (Condens for example) is transformed into a corrosive acid (HCl) which leads to a higher degree of toxicity for the lubricant

The content of metals particles are decreasing by around 70% already within 10 hours testing- This test has been performed on the same engine in a controlled environment.

Further testing points to a further reduction of metal particles > 85%. The high measured value is 92%. This gives lower fuel consumption and reduced wear and a more efficient engine.

Water in lubricant could exist not visible to the eye and could reduce the life time on vital parts, e.g. bearings by 75%. Water in lubricants causes oxidation, acid and ferric, pollution and viscosity problems. Water makes the lubricant initially thicker and then thinner than the original viscosity. Water dramatically increases the corrosion, especially engines and machinery that are not running constantly (ex. Marine engines etc.). Boron CLS H3-BO3 are combined with H2O (Water) creating a self repairing film due to the bonding of the Boron. The bonding isolates the metal surface against corrosion.

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