

The Effect of Valve Coating on Diesel Engine Emissions

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AST
Thermal Coatings

Alliance
Fleet Services

DET
Emissions

Solutions To Drive Your Business Into The Future



•Diversified into the On / Off highway commercial heavy duty applications

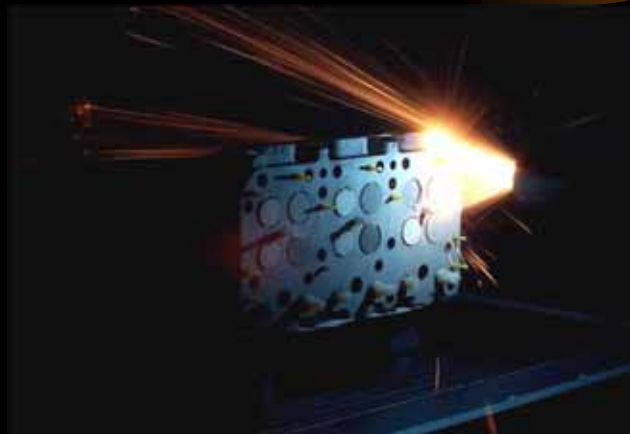
Diesel Engine Transformations

--Services Offered

- Diesel Engine Head Exchange Program
- Rebuild and Return (R&R) service
- Authorized Engine Parts Distributor
- R&R Heavy-Duty Industrial Caliper Program
- Diesel Engine Emission Control (Patented Product—Green Coat®)



D.E.T. Green Coat® Process



Tradition of Excellence Alliance /D.E.T. Remanufacturing

- 16 + year history in remanufacturing
- 200+ Employees
- 50,000 sq ft Facility
- Specializing in critical application products
 - Hydraulic Brake Calipers
 - Hydraulic Brake Master Cylinders
 - Diesel Cylinder Heads

Operating Principles

- The Ignition Lag is Reduced.
- The gases do more work on the piston.
- Lower peak temperatures with lower NOx.
- More time to burn out unwanted emissions.

Two Strategies

- Coat the whole firedeck including the valve faces for longer engine head life plus catalytic effect.
- Coat only the valve faces for just the catalytic effect.

Results todate

- Caterpillar 3508 rated at 850HP
- Significant reduction in NOX
- Full Load 905 ppm to 256 ppm
- 50% Load 406 ppm to 103 ppm
- 39% Load 330 ppm to 16 ppm

Results todate

- Deutz 1013 Air Cooled 200 HP
- Gain of 2% to 3% Power Output as measured by lower exhaust temperatures.
- Reduction in CO from 321 ppm to 71ppm
- No Significant Change in NOx

Significance of Data

- For the Caterpillar 3508 Dynamometer Tests.
- The NOx reduction shows a reduction in peak temperatures associated with NOx generation.
- Field tests in a bulldozer engine application are now being planned.
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Significance of data.

Only 2 hours operation was needed to get these initial results.

The NO_x values are expected to show a decrease.

Additional Tests

- Tests are now being planned with a John Deere Diesel 3.92 liter that drives a plant air compressor.
- Also a Lister Petter Diesel 1.92 that is fitted with an electrical brake.

Path Forward



- A Confidentiality Agreement is in place with Cummins.
- Infrastructure is now in place for economical coating of valve faces.