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H_2-Assisted NOx Traps: Test Cell Results Vehicle Installations

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Project Objectives

- Determine Advantages of H_2 Assisted NO_x Trap Regeneration
- Establish Feasibility and Effectiveness of H_2 Assisted NO_x Traps in a Bus Installation
- Establish Feasibility and Effectiveness of H_2 Assisted NO_x Traps in a Light Duty Vehicle Installation

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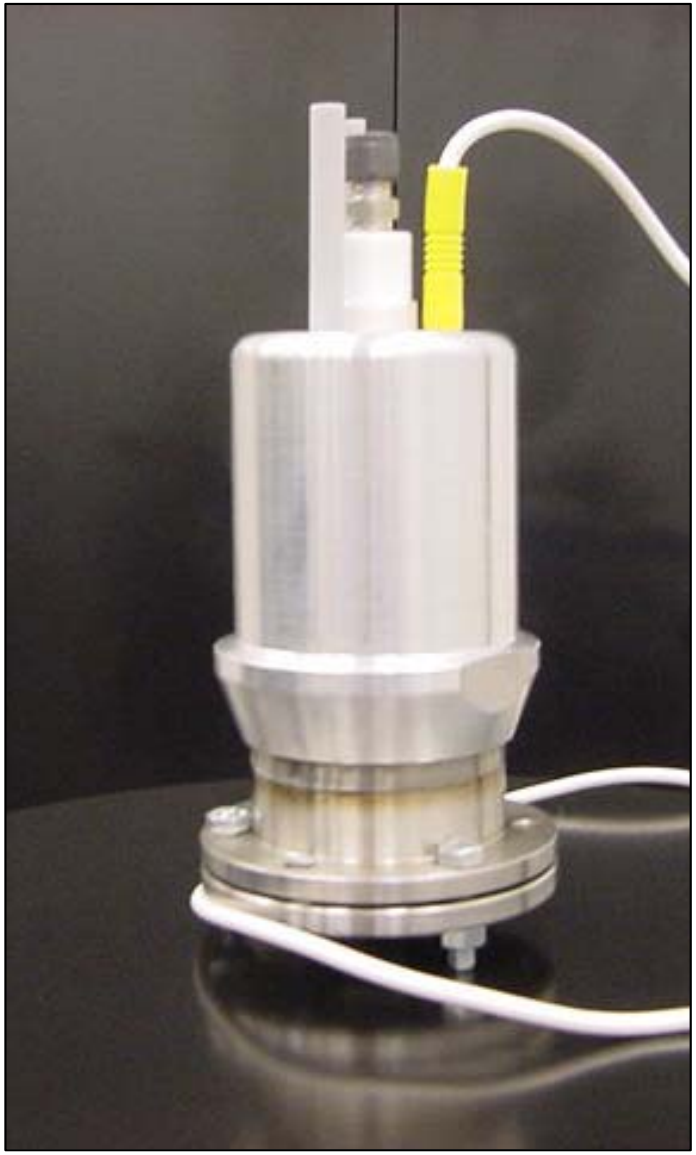
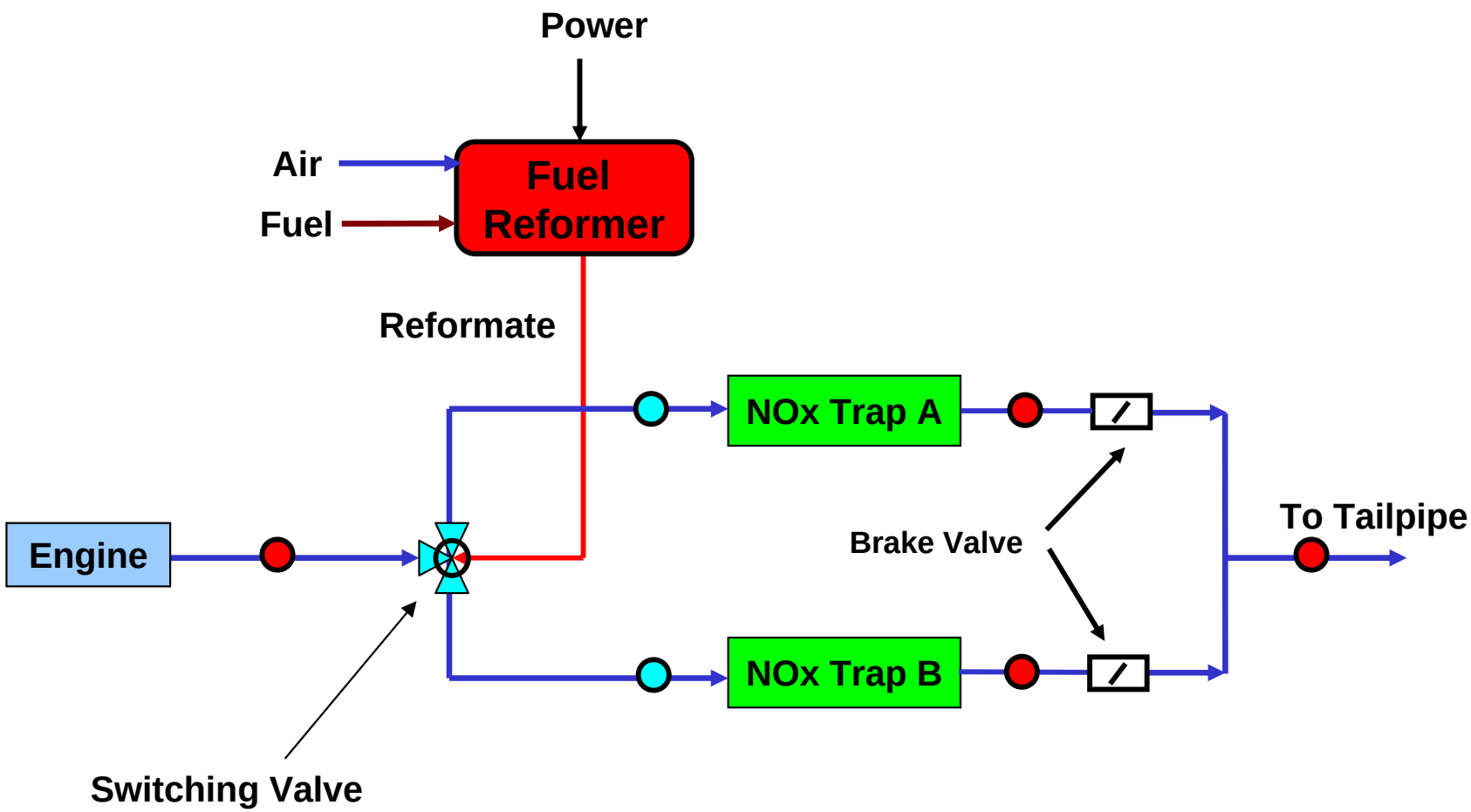
Gen H Fuel Reformer

- After-treatment Suitable
  - Reforms Diesel: 22% H_2
  - Low soot
- Enclosed housing
  - EMI reduced
  - Safety improvement
- New Power Supply
  - Under 250W consumption
  - Minimal heat rejected
  - Compact transformer
- High-temperature flange seals
  - Reduced leakage



H2-Assisted NOx Trap: Test Set-up



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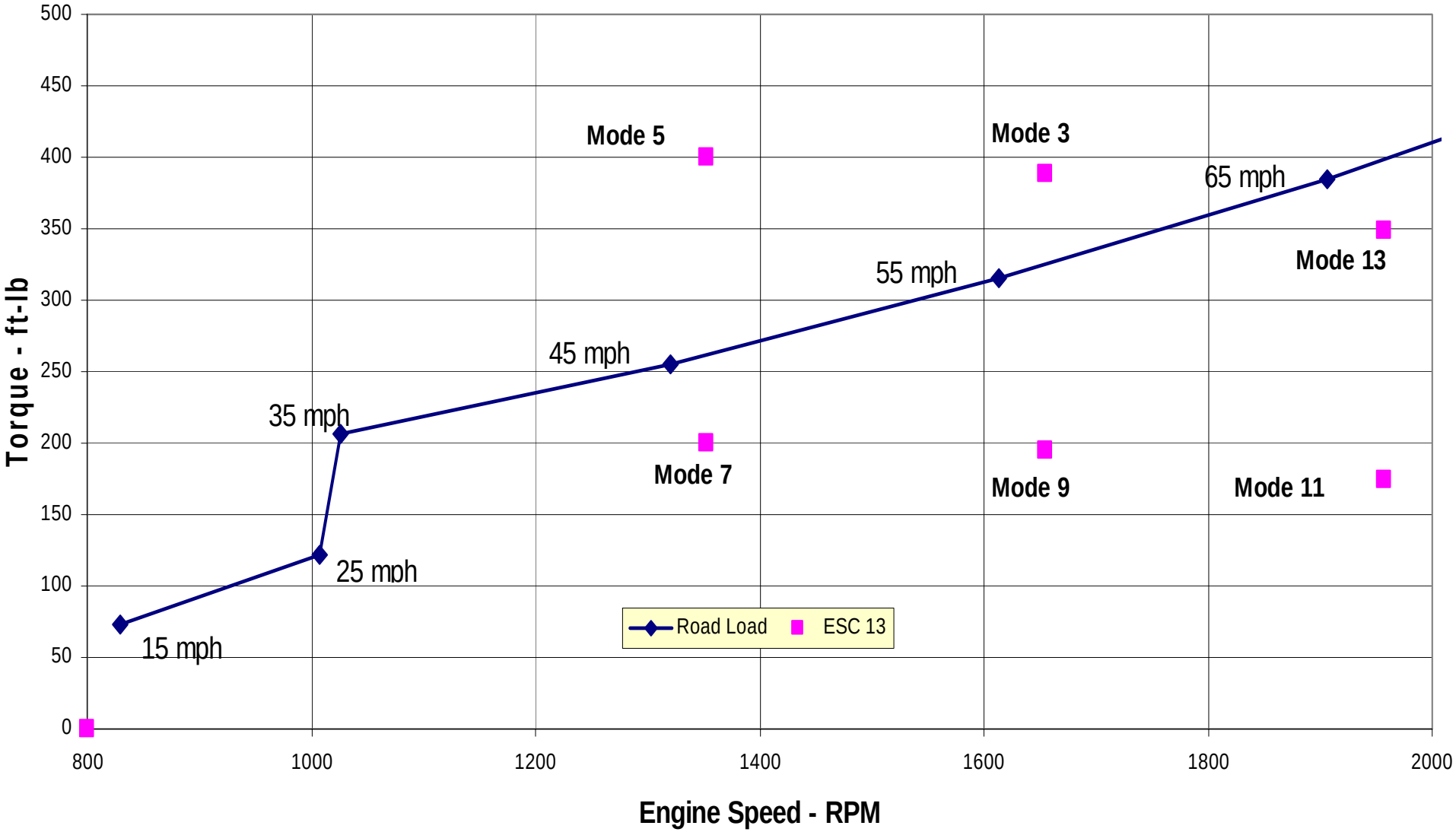
Test Cell Installation: H2-Assisted NOx Trap

Cummins 8.3L MY2000

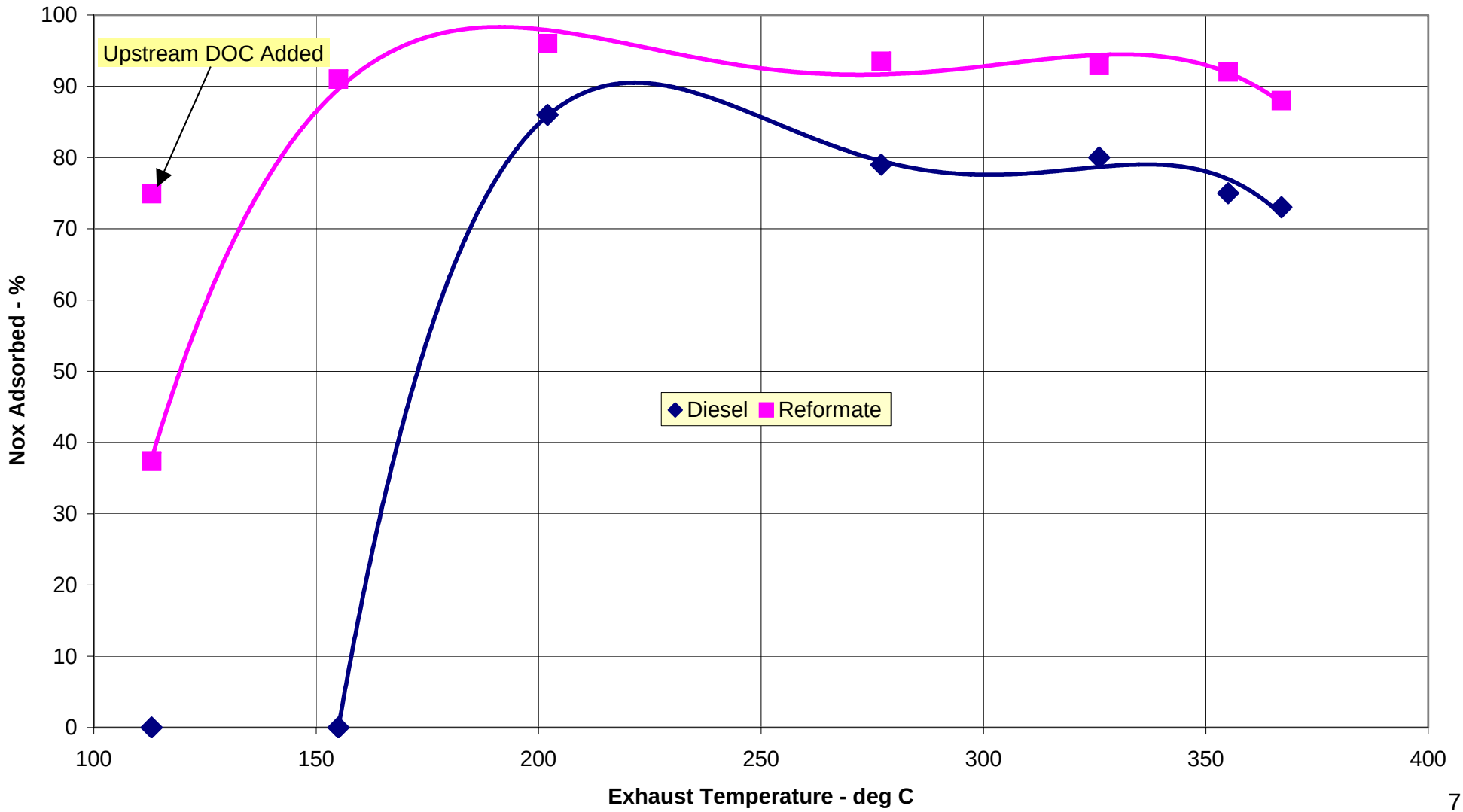
NOx Traps 14L/leg

Switching Valve

BUS Road Load vs ESC 13 Mode



NOx Adsorption Comparison – Bus Road Load Same Fuel Penalty



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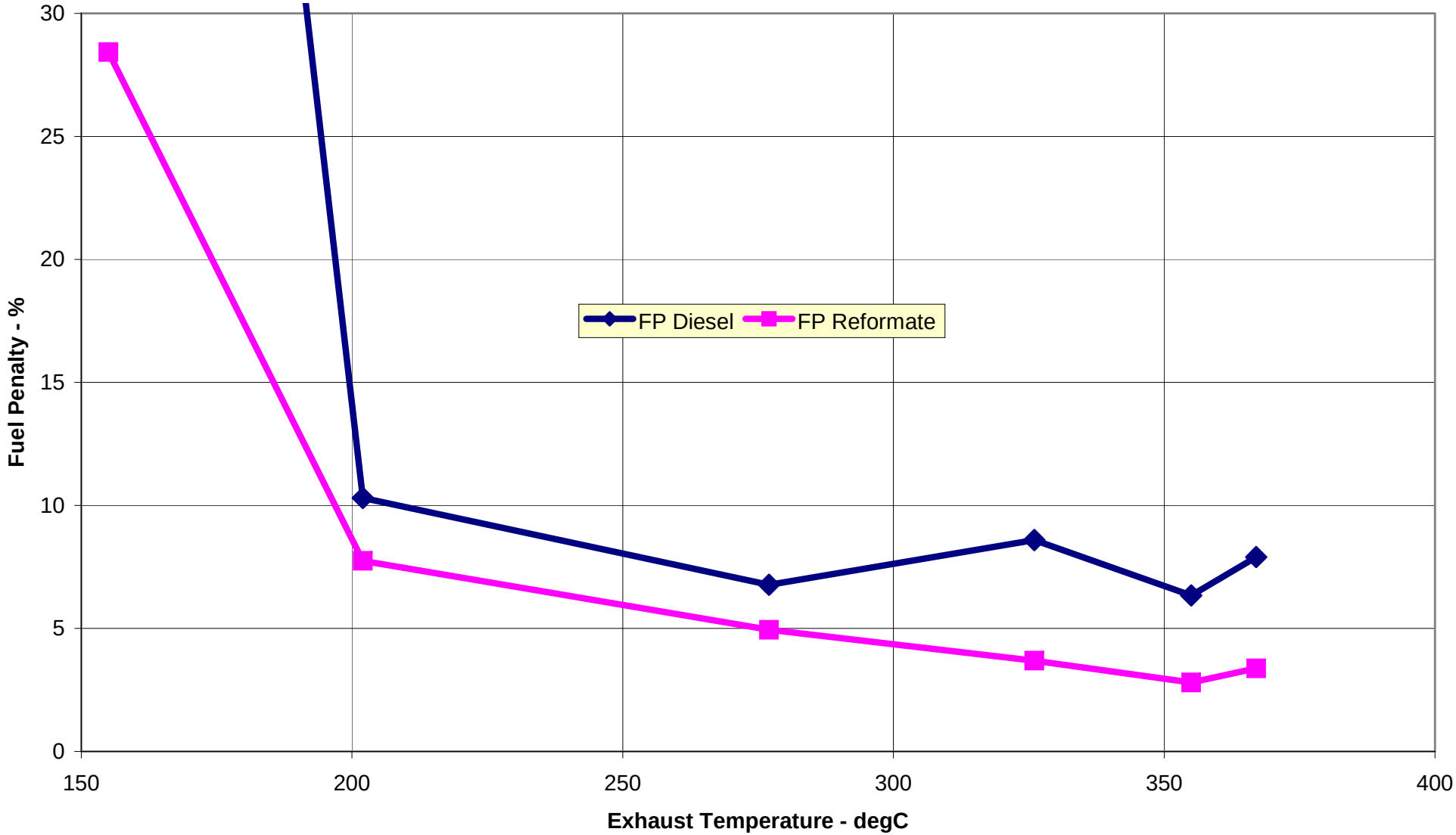
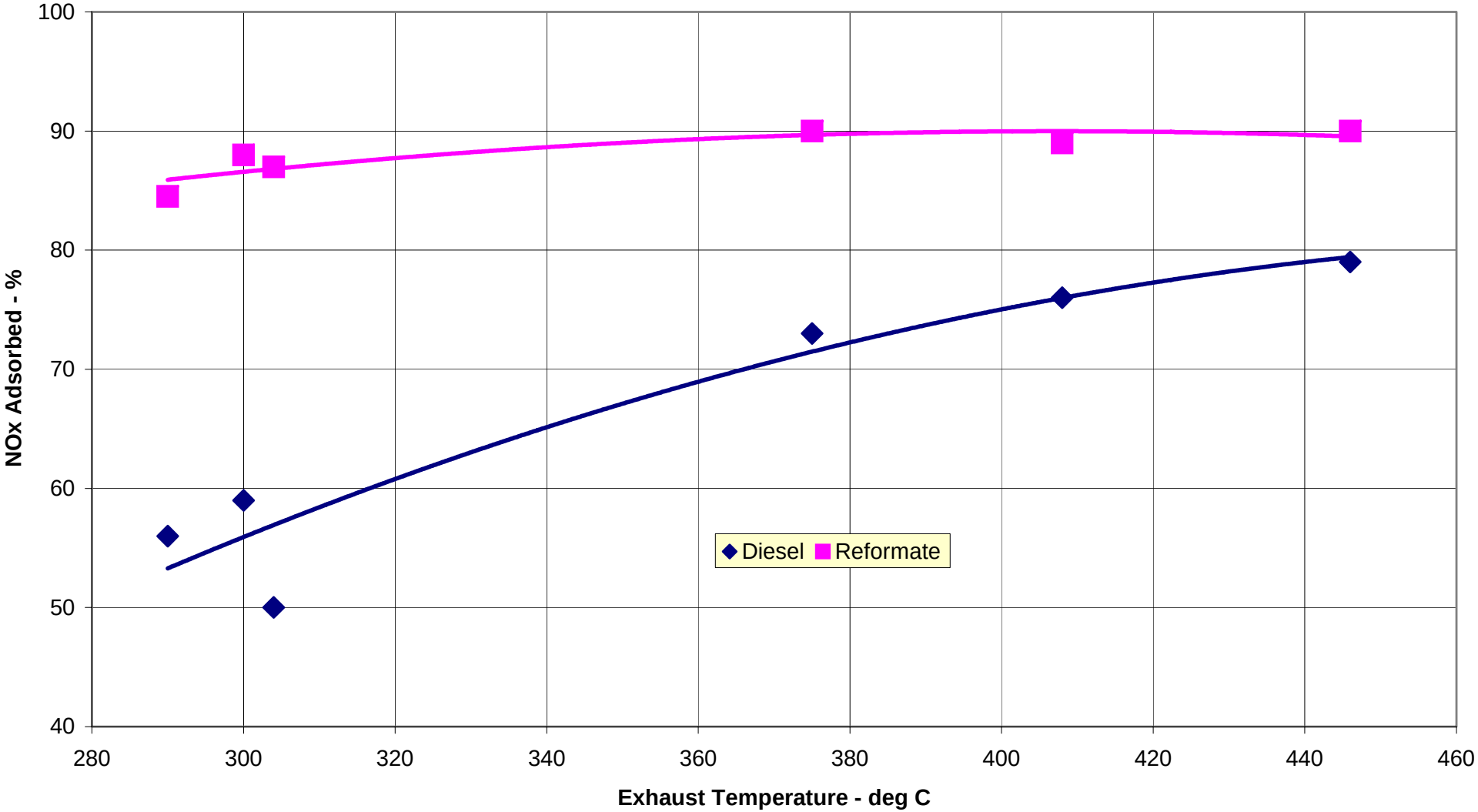
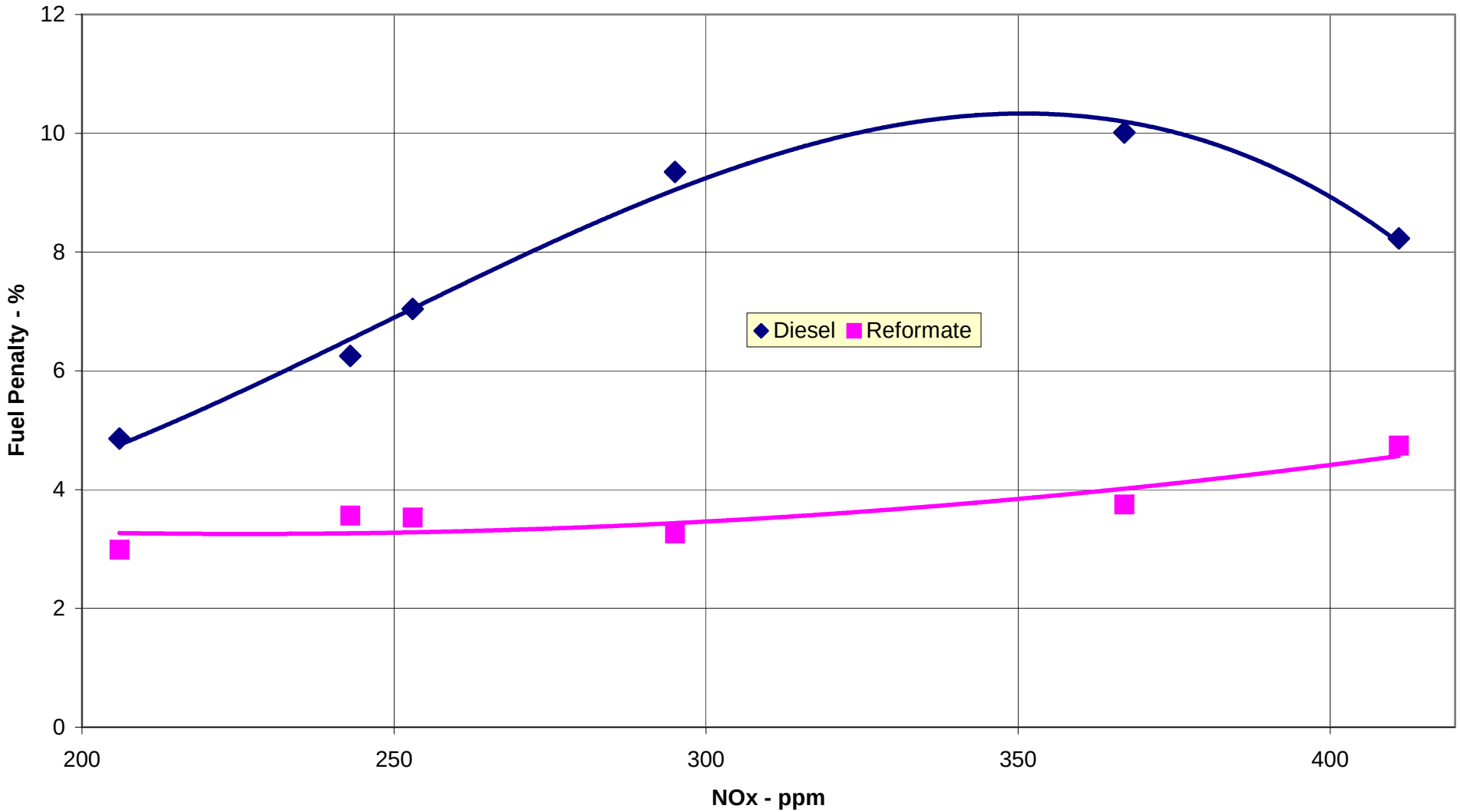
Fuel Penalty - Bus Road Load
Same NOx Adsorption



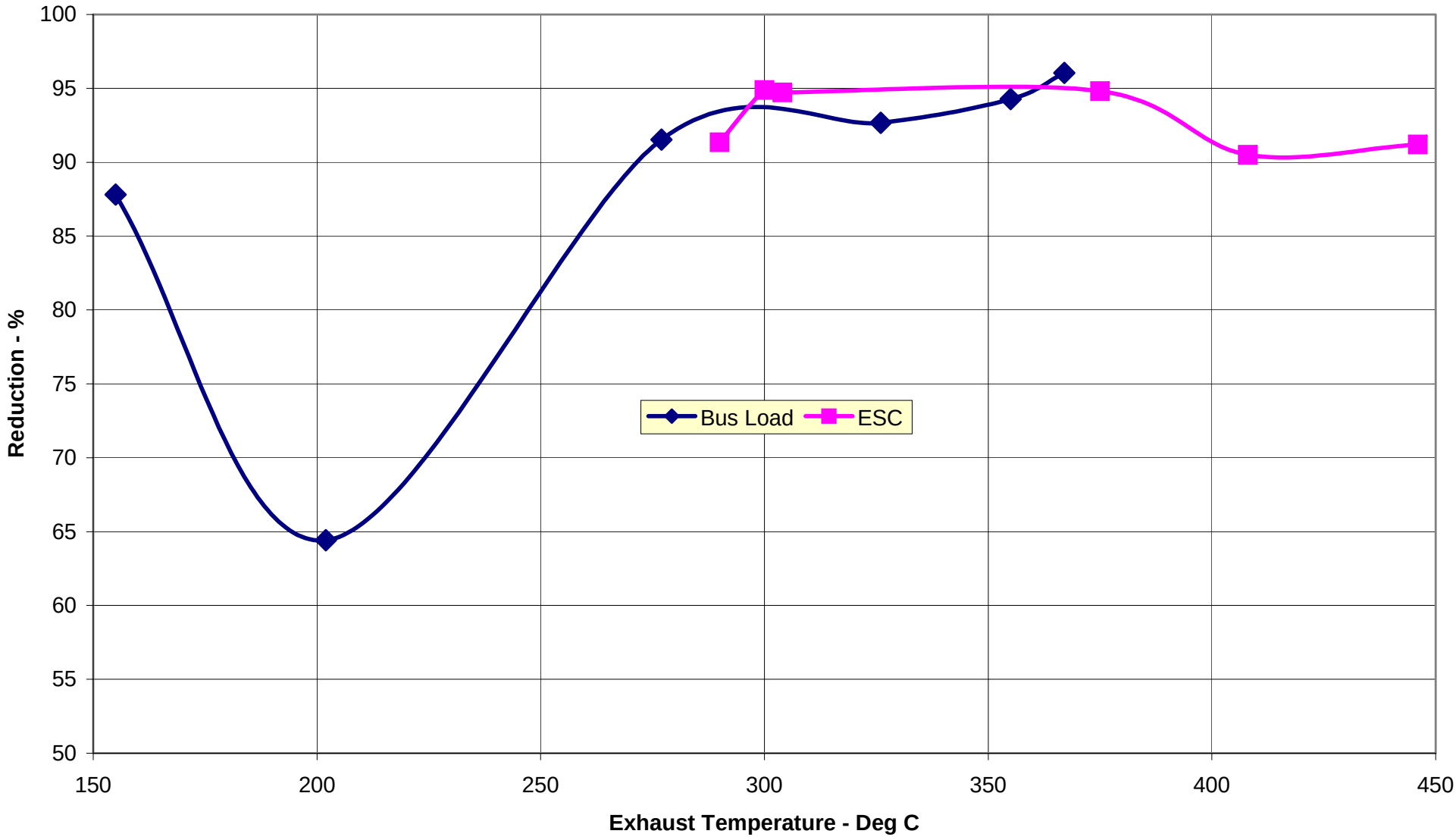
NOx Adsorption - ESC Modes Same Fuel Penalty



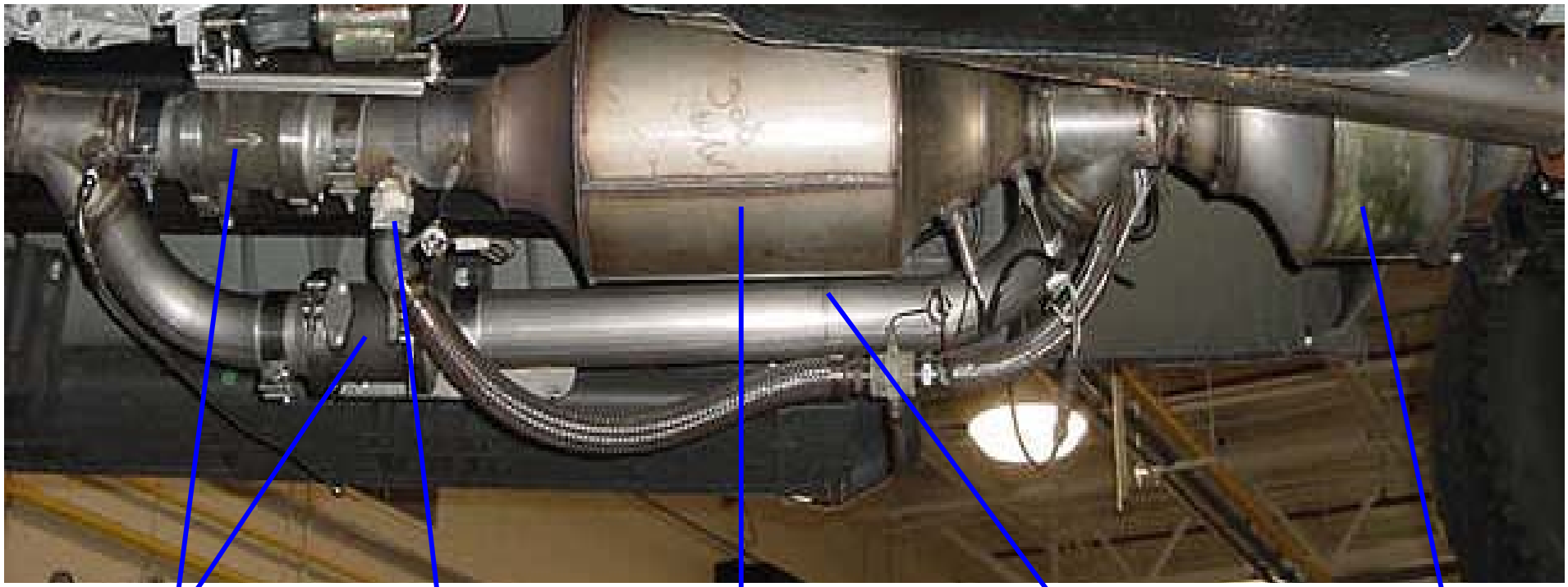
Fuel Penalty - ESC Modes
Same NOx Adsorption



Reduced Hydrocarbon Slip



F250 H2-Assisted NOx Trap Installation



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Bus H2-Assisted NOx Trap Installation

Access Door

Fuel Reformer Box

NOx Trap:
21L/leg

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Summary of Results: H2-Assisted NOx Trap

- Regeneration Fuel Penalty Reduction of roughly 50% at moderate exhaust temperatures
- Idle regenerations achieved
- Hydrocarbon slip dramatically reduced
- Dual Leg System installed and operating on a Transit Bus: 80 – 90% NOx Reduction
- Single Leg Bypass System installed and operating on an F250 Truck: 70% NOx Reduction

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Future Efforts: H2-Assisted NOx Trap

- Investigate Potential Advantages in Desulfation of NOx Traps: Lower Temperature and Reduced Duration
- Test other NOx Trap Formulations: Improve both High and Low Temperature Performance
- Develop Gen H Fuel Reformer into a mature product