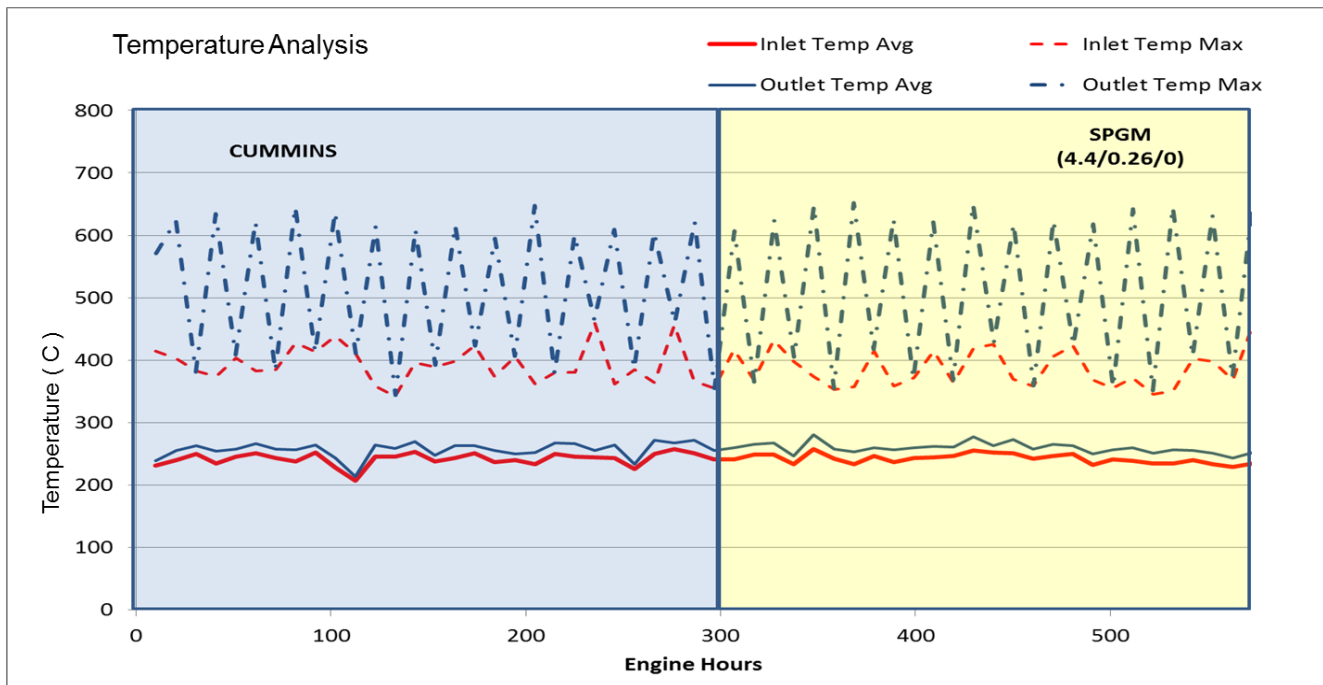


SPGM™ DOC Technology

On-Road Testing: Data Logging Cummins versus CDTi SPGM DOC



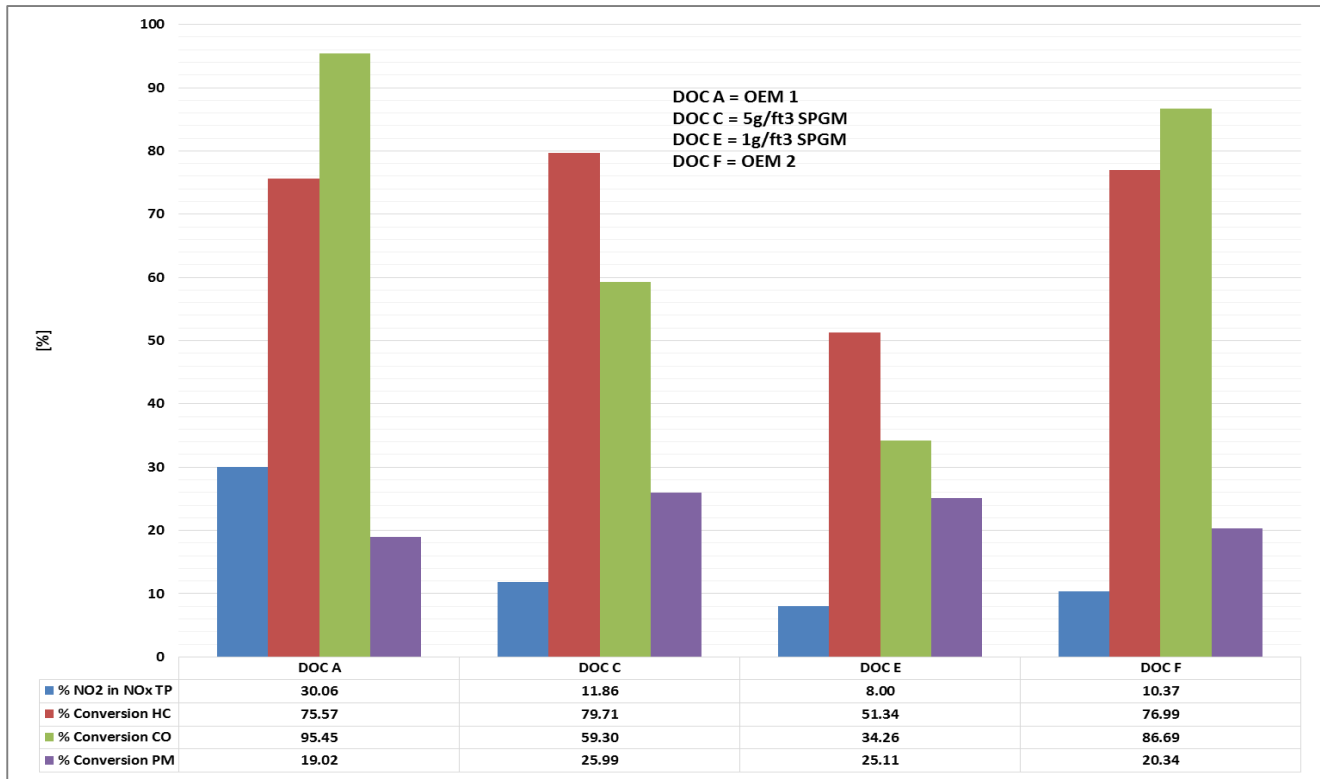
- Transit bus #939
- Drive Cycle: Urban/Freeway
- Engine 2007 Cummins ISL 8.9L 250-330hp
- Cooled EGR, Cummins patented VG Turbo, High Pressure Common Rail fuel injection and Cummins Particulate Filter
- Replaced Cummins DOC at 35 g/ft³ of PGM for SPGM DOC at 4.75 g/ft³ of PGM

Conclusion:

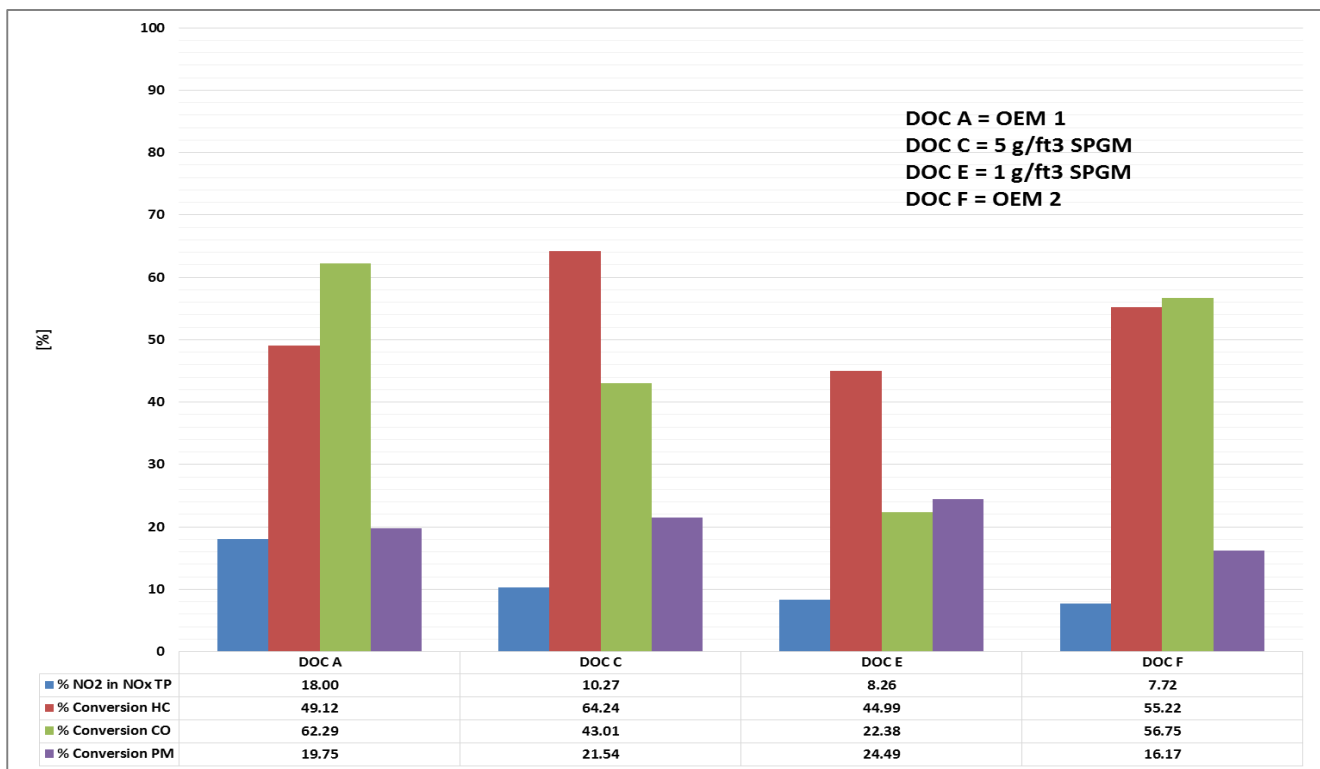
- Cummins vehicle triggers active regeneration every 20 hours; no difference when switched to CDTi SPGM DOC.
- Same Exotherm and maximum peak temperature

Benchmark Testing: Two OEMs versus CDTi SPGM DOC

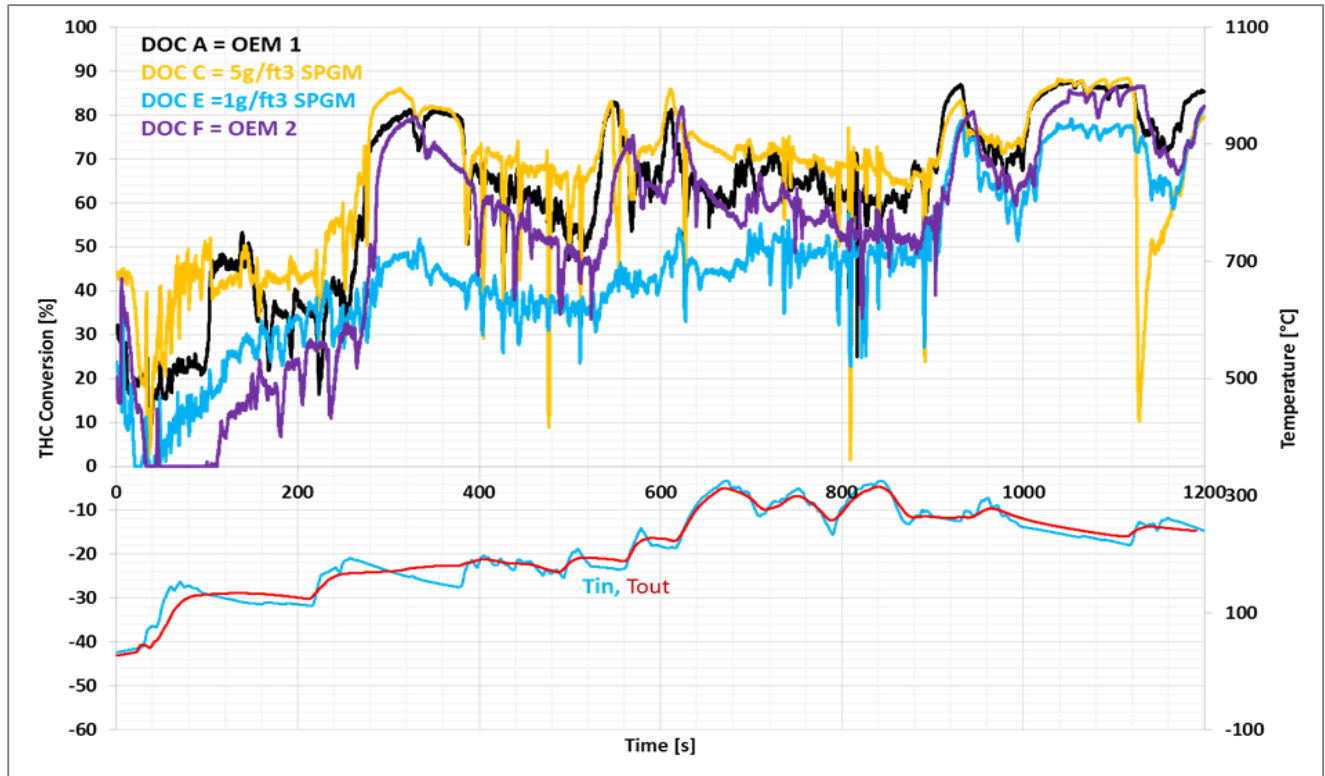
HOT FTP TEST RESULTS



COLD FTP TESTS RESULTS:



COLD FTP TEST THC PERFORMANCE



- Testing performed at Excel Engineering, Diagonal Iowa
- Benchmark Comparison
 - CDTi SPGM DOC at 5g/ft3 PGM
 - CDTi SPGM DOC at 1g/ft3 PGM
 - OEM 1 DOC at 35g/ft3
 - OEM 2 DOC (Euro VI Certified System) at 38g/ft3
- All DOCs were aged 30 hours, at 650°C with 10% steam

Conclusion:

- SPGM DOC at 5 g/ft3 showed superior light off to either OEM DOC
- SPGM DOC at 1 g/ft3 showed inferior light off to either OEM DOC

Emission Control System Supplier Evaluation: OEM versus CDTi SPGM DOC

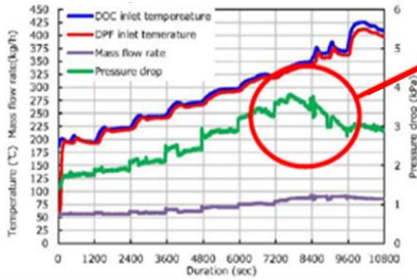
Back Pressure Test Condition and Results

BPT Test Condition

Engine speed	1,300rpm constant
DPF inlet Temp.	200degC – 400degC (25degC step)
Holding time	20min at each step

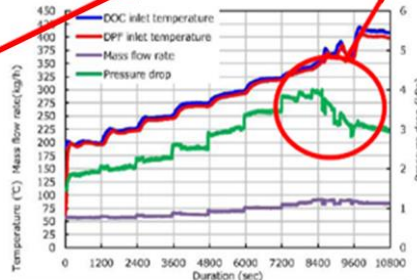
SPGM DOC enables equivalent filter regeneration performance

OEMs DOC + DPF



Soot loading amounts before BPT	7.8g (3.2g/L)	A
Soot emission amounts during BPT	2.4g	B
Soot combustion amounts during BPT	3.3g	C
Combustion rate during BPT	32%	C/(A+B)

SPGM DOC + DPF



Soot loading amounts before BPT	8.4g (3.4g/L)	A
Soot emission amounts during BPT	2.7g	B
Soot combustion amounts during BPT	3.4g	C
Combustion rate during BPT	31%	C/(A+B)

- Emission Control System Supplier testing of SPGM DOC: 4.75g/ft³ versus 71g/ft³ OEM DOC
- For use before filter in DOC+CDPF configuration
- BPT = Back Pressure Testing

Conclusion:

- SPGM DOC at 4.75g/ft³ enables equivalent filter regeneration performance to OEM DOC

For inquiries, please contact:

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