

# CAMBUSTION

## The Engine Emissions Specialists



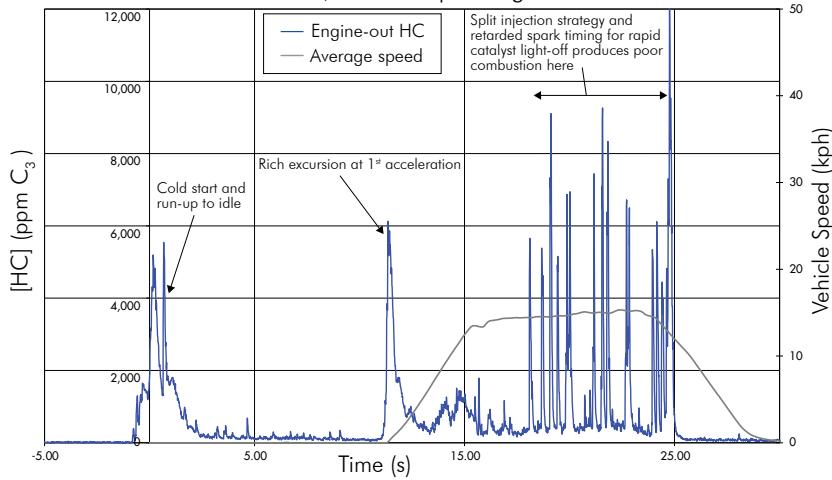
A collage of various engine emissions-related terms and concepts:

- Advance
- Fast
- Strategy
- RDE
- PEMS
- AFR
- particulate
- Real-World
- Blow-through
- Timing
- Size
- Cranking
- NRTC
- Stratified
- Lambda
- analyzer
- Calibration
- GPF
- Cold-start
- WLTC
- Altitude Testing
- Cycle-by-cycle
- SML
- Particle Number
- Mass
- CO
- Fast
- BMEP
- Boost
- PM
- CNG
- PFI
- Injection
- Overlap
- Oil
- Intake
- Residuals
- filter
- ash
- Light-off
- >23nm
- Droplet
- Optimization
- maximum
- soot
- load
- restart
- retard
- EGR
- SCR
- CO
- HC
- fuel
- gasoline
- calibrate
- Combustion
- Purge
- VVT
- hybrid
- LNG
- Efficiency
- Emissions
- 7°C
- In-cylinder
- diesel
- PN
- GD<sub>i</sub>
- backpressure
- loading
- Performance
- Optimize
- >10nm





Downsized turbo GDI 1.6 litre, EURO IV passenger car cold start HC emissions



### Raw exhaust sampling

In-cylinder HC measurements\*

Cycle-by-cycle HC measurement

On-board capability for RDE\*

Intake manifold sampling\*

Cold start combustion stability

FID

AK protocol

Two channels as standard

1 ms  $T_{10-90\%}$  response time

Sub-zero sampling capability\*

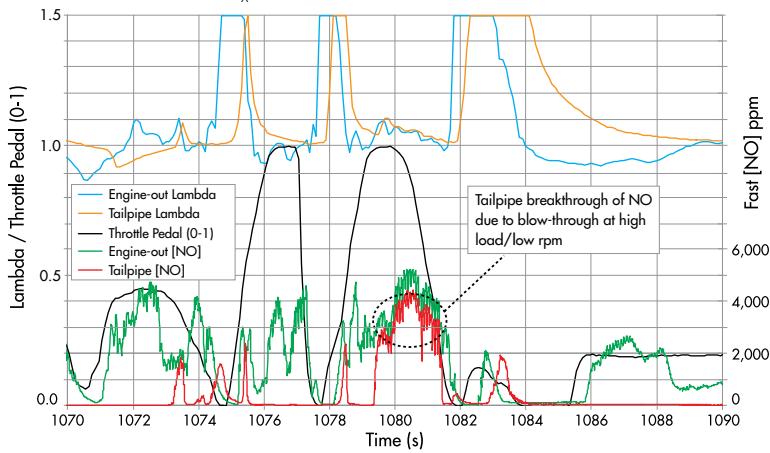
\* Some applications require additional hardware

# Fast Response NO<sub>x</sub> Analyzer

Gas analysers easily configurable\* between test cell and RDE use



Blow-through causing NO<sub>x</sub> breakthrough: 2.0 Euro 6 turbocharged engine - WLTC



Raw exhaust sampling

In-cylinder NO<sub>x</sub> measurements\*

Cycle-by-cycle NO<sub>x</sub> measurement

On-board capability for RDE\*

Scavenging blow-through

CLD

AK protocol

Two channels as standard

2 ms T<sub>10-90%</sub> response time

Sub-zero sampling capability\*

[sales@cambustion.com](mailto:sales@cambustion.com)

[www.cambustion.com](http://www.cambustion.com)

\* Some applications require additional hardware

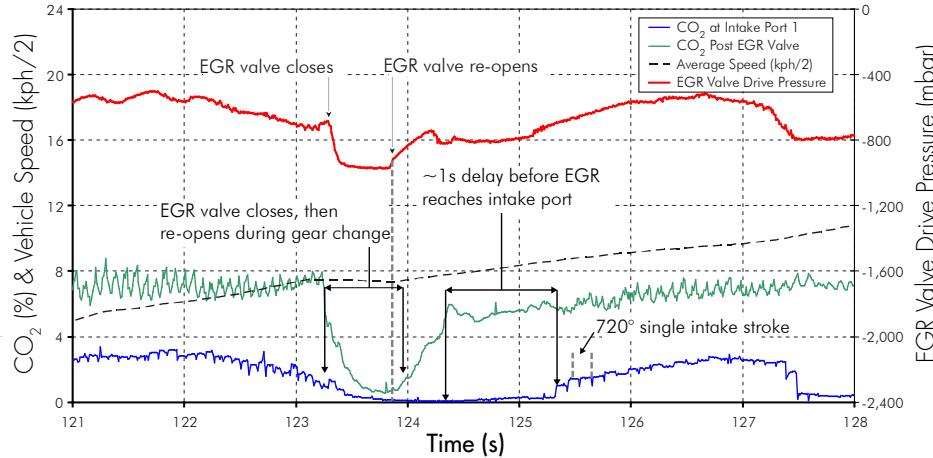
# Fast Response CO&CO<sub>2</sub> Analyzer

CAMBUSTION

Gas analysers easily configurable\*  
between test cell and RDE use



EGR delay during gear change on a diesel passenger car



Raw exhaust sampling

In-cylinder CO<sub>x</sub> measurements\*

Cycle-by-cycle CO<sub>x</sub> measurement

On-board capability for RDE\*

EGR measurement

Intake manifold sampling\*

NDIR detector

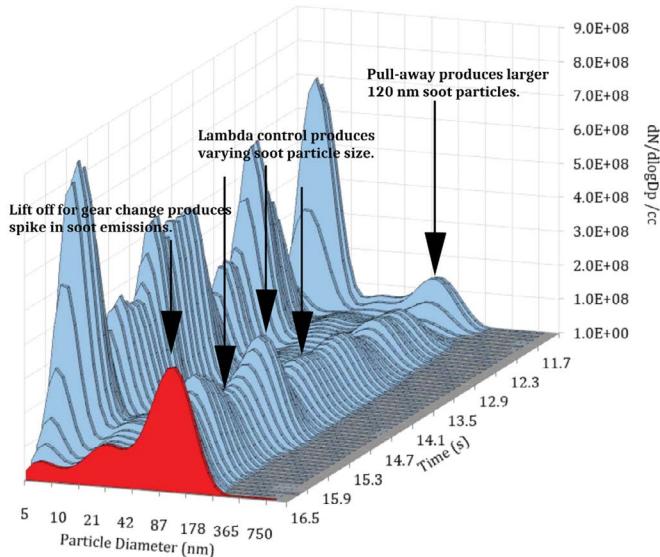
AK protocol

Two channels as standard

8 ms T<sub>10-90%</sub> response time

Sub-zero sampling capability\*

\* Some applications require additional hardware



Particle number, mass & size  
from one instrument

200 ms  $T_{10-90\%}$  response time

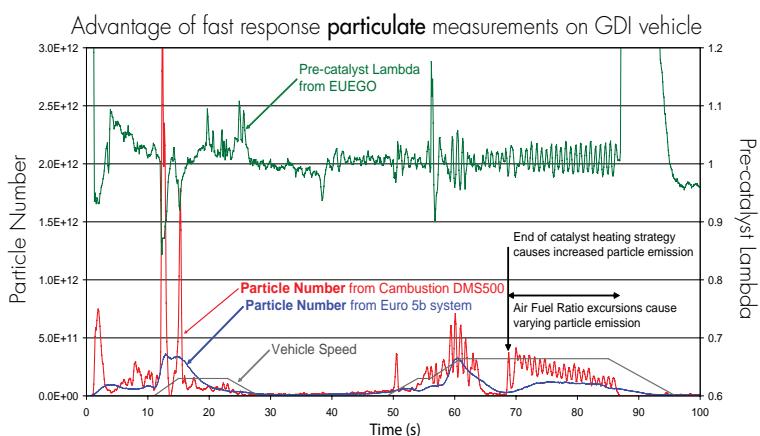
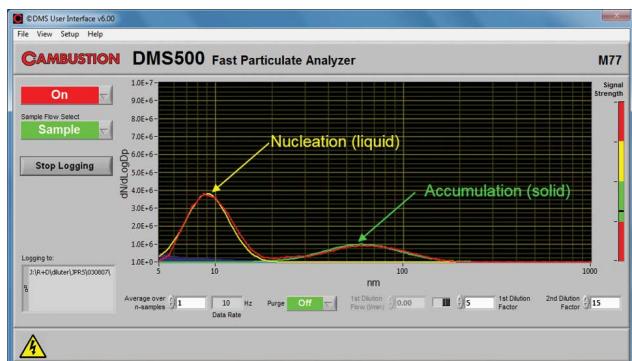
Raw exhaust sampling

5nm–2.5 $\mu\text{m}$  size range

Sub-zero sampling

10Hz data

AK protocol



## Applications:

Transient engine calibration

PM, PN >10nm & >23nm

GPF/DPF development

RDE calibration

Brake particles



GPF and Light to Heavy duty  
DPF testing

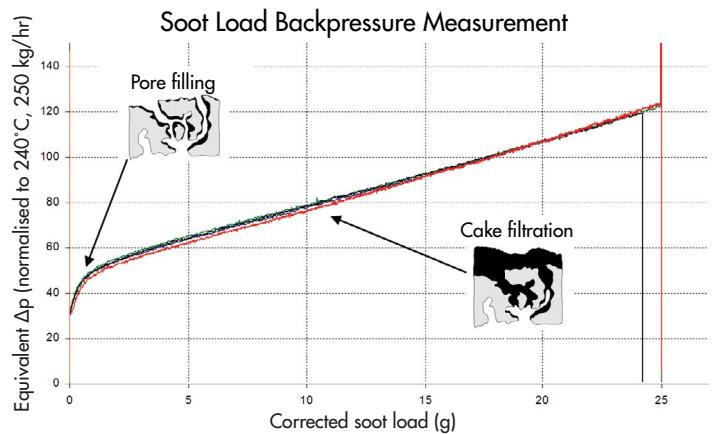
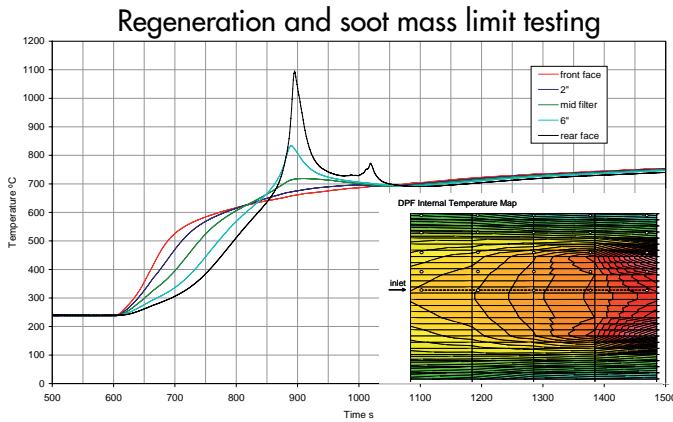
Soot loaded back-pressure  
testing

Regeneration Testing

Ash loading

Filtration Efficiency Measurement

Catalytic Activity Testing



20 g/hr max loading rate

Automated & unattended  
operation

Canned / un-canned filters

Minimal installation requirements