

# Emissions Concerns for the Performance Calibrator

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# Permitted Changes

- Catalyst Repairs using certified components
  - “The vehicle is beyond the coverage of the OEM catalyst warranty period (which can vary from 7 years or 70,000 miles to as high as 15 years or 150,000 miles)”
  - “The vehicle has a legitimate need for replacement of the existing converter...”



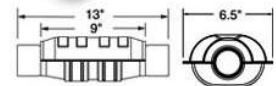
## CALIFORNIA OBDII 41000

(CARB) California Air Resource Board Compliant. California OBDII Universal-Fit Catalytic Converters For California Register'd Vehicles  
MADE IN 1996 AND AFTER.

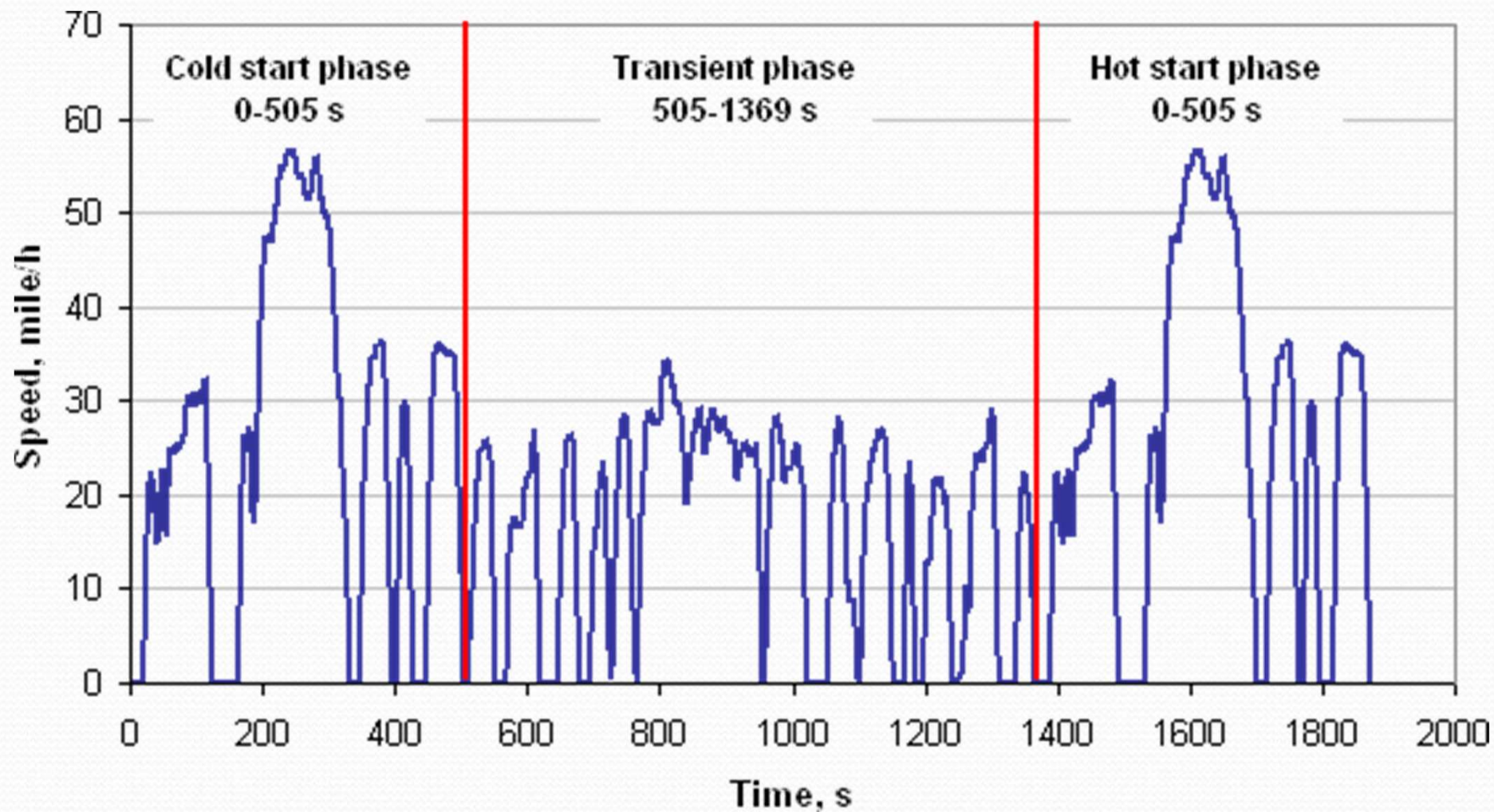
### 41000 California OBDII Short Oval

IN/OUT	PART#
2"	<a href="#">41004</a>
2.25"	<a href="#">41005</a>
2.5"	<a href="#">41006</a>

To learn more about California OBDII Catalytic Converters click [HERE](#)



# FTP 75



# Did We Pass?

2014 5.3L Supercharged  
Silverado

Tested: 11/24/2015

Weighted Results	THC	CO	CO <sub>2</sub>	NO <sub>x</sub>	NMHC	CH <sub>4</sub>	FE [mpg]		
Weighted g/mi	0.04394	0.54406	579.4862	0.00907	0.03123	0.01297	15.31		
Rounded g/mi	0.04	0.54	579.5	0.009	0.031	0.013	15.31		
		CO		NO <sub>x</sub>	NMOG			HCHO	PM
Standard T <sub>2</sub> B <sub>4</sub>		2.1		0.04	0.07			0.011	0.01
Applied DF		0.29		0.014	0.0123			0.0003	
Corrected		0.83		0.023	0.045				
		39.5%		57.5%	63.6%				
NMOG = 1.04(NMHC)	0.03224								

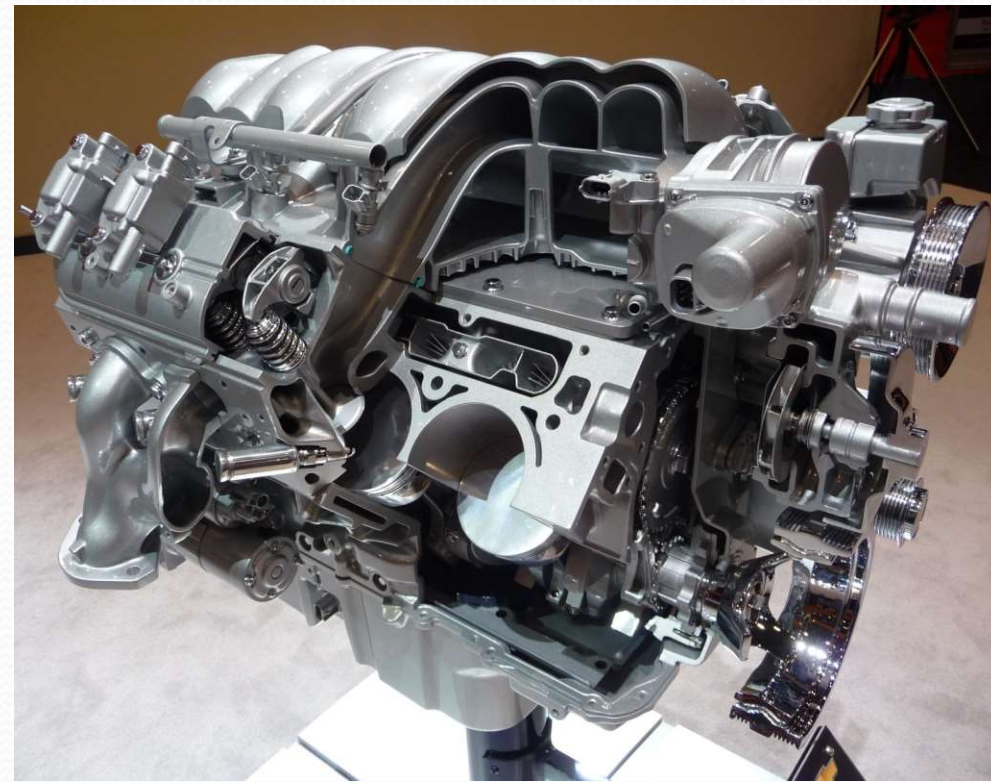
# OBDII

- On Board Diagnostics – Level 2
  - Required for all passenger vehicles after 1996
  - In-use monitoring of vehicle emissions equipment and performance
  - ECU monitor to detect potential emissions problems
    - Passive monitors
      - Range limits of learned trims (e.g.: fuel delivery)
    - Active tests
      - Catalyst performance, knock detection, et. Al.
  - Ability to update ECU calibration data in service



# The combustion chamber is the first step in emissions control!

- Minimize waste of fuel during pyrolysis
- Balanced H:O, C:O ratios for delivered fuel
- Promote *complete homogeneous* combustion at desirable temperature



# VE Comparison

- Stock vs. Heads/Cam LS1, 2002 Camaro Z28

		Engine Speed (rpm)																			
		400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,400	6,800	7,200	7,600	8,000
Manifold Absolute Pressure (kPa)	15	-5	-6	-10	-14	-9	-11	-9	-9	-10	-5	-5	4	7	14	19	25	21	21	21	21
	20	-6	-13	-17	-15	-12	-13	-9	-14	-15	-13	-11	-2	3	10	18	24	21	21	21	21
	25	-11	-16	-21	-15	-12	-13	-12	-15	-18	-16	-15	-8	-4	1	6	11	8	8	8	8
	30	-12	-18	-24	-16	-11	-12	-12	-17	-16	-13	-14	-8	-3	1	5	8	4	4	4	4
	35	-14	-19	-23	-17	-11	-10	-10	-15	-13	-11	-10	-4	-1	1	5	8	4	4	4	4
	40	-15	-19	-24	-16	-11	-8	-7	-13	-11	-11	-9	-4	-1	1	3	5	1	1	1	1
	45	-15	-20	-21	-16	-10	-7	-6	-11	-9	-10	-8	-3	-1	0	2	3	0	0	0	0
	50	-12	-17	-19	-14	-9	-4	-3	-9	-9	-10	-8	-3	-1	0	2	2	-1	-1	-1	-1
	55	-13	-17	-19	-14	-6	-4	-3	-8	-7	-9	-6	-3	-1	0	2	2	-1	-1	-1	-1
	60	-12	-17	-16	-14	-6	-4	-3	-4	-4	-3	-2	2	3	4	5	5	2	2	2	2
	65	-7	-12	-15	-14	-6	-2	-4	-5	-3	-3	-1	2	5	5	7	6	3	3	3	3
	70	-5	-10	-13	-14	-6	-1	-1	-3	-2	-2	-2	2	4	5	7	6	3	3	3	3
	75	-4	-7	-12	-14	-3	-2	0	-2	0	-2	-2	2	5	7	8	7	4	4	4	4
	80	-4	-6	-11	-14	-3	-2	0	0	1	-2	0	3	7	9	10	9	6	6	6	6
	85	-3	-6	-10	-14	-2	-2	1	0	1	-2	0	3	6	8	9	9	6	6	6	6
	90	-1	-6	-9	-13	-3	-3	0	-1	3	0	-1	2	6	8	9	9	6	6	6	6
	95	0	-4	-10	-12	-4	-4	0	-1	2	0	-1	2	5	8	8	8	6	6	6	6
100	-1	-6	-11	-12	-5	-4	-1	-1	2	0	-2	1	4	7	8	8	5	5	5	5	
105	-1	-6	-11	-12	-5	-4	-1	-1	2	0	-2	1	4	7	8	8	5	5	5	5	

# Aftermarket EO vs MOR Certs

## Manufacturer of Record

- Certified Coastdowns
- Aged Catalyst (FUL)
- Complete 5-cycle Emissions
- Complete 5-cycle Fuel Econ
- Monitors must complete on cycle(s)
- Complete OBD Demonstration
  - MIL @ 1.5x Emissions Std.
- SHED Testing

## Aftermarket EO

- Assigned Coastdowns
- Assigned DF for 4K Vehicles
- Fewer Cycles for Emissions Only
  - FTP 75
  - USo6
  - SCo3 (Abridged)
- On-road Demonstration for Monitors Allowed



# Sample Modal Data

Total HC Modal

