Attachment A

OBD II System Certification 'A-P' Document

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A. Cover Letter

Manufacturer Letterhead

April 24, 2016

Ms. Jane Doe, Chief
Emissions Compliance, Automotive Regulations and Science Division
California Air Resources Board
9480 Telstar Avenue, No4
El Monte, CA 91731

Subject: Manufacturer ABC 2017 MY Certification

Dear Ms. Doe:

Please find enclosed the application documents for the OBD II systems on the 2017 model year test groups HABCDE02.0FGH, HABCDE02.1FGH, HABCDE02.2FGH, HABCDE02.3FGH, HABCDE02.4FGH, and HABCDE03.0FGH.

This cover letter includes a list identifying: (1) all concerns and deficiencies applicable to the equivalent test group from a previous model year and the changes and/or resolution of each concern or deficiency for the current model year for test groups HABCDE02.0FGH, HABCDE02.1FGH, HABCDE02.2FGH, and HABCDE02.3FGH, and (2) all known concerns and deficiencies (e.g., from different test groups having the same underlying concern/deficiency) applicable to test groups HABCDE02.4FGH and HABCDE03.0FGH. The list is as follows:

<Include list of concerns/deficiencies here or as attachment>

This letter also contains a timeline showing the start of normal production, the time the vehicles will be first introduced into commerce, and the deadlines for production vehicle evaluation testing for the test groups listed above. This information is provided below. If the timeline changes in the future, Manufacturer ABC will update the XXX file ***<e.g., "Certification Schedule" file>*** in DMS with the updated timeline.

This letter also contains a table listing all test groups scheduled for the 2017 model year and the OBD II phase-in requirements that apply to each test group. This table is also provided below. ***<If the phase-in table is already included in another file (e.g., "Phase-In Sheet" file) uploaded to DMS, then add a sentence here stating this in lieu of adding the table in this cover letter>.***

Manufacturer ABC also hereby submits a statement of compliance to the California Air Resources Board for the 2017 model year that covers the test groups listed above. Manufacturer ABC makes the following statements of compliance regarding the aforementioned test groups:

1) The test groups comply with the requirements of title 13, California Code of Regulations section 1968.2, with the exception of the deficiencies indicated above.

2) Manufacturer ABC will comply with the required deadlines indicated below for submission of results/data for production vehicle evaluation testing under sections 1968.2(j)(1) through (j)(3).

Thanks in advance for your prompt attention to this matter. Should you have any questions, please feel free to contact me at xxx-xxx-xxxx.

Sincerely,

Jon Doe

ABC Motors OBD Certification Representative

Production Vehicle Evaluation (PVE) Timeline

Test Group	Start of Normal Production Date	Date Introduced into Commerce	Section 1968.2 PVE (j)(1) Deadline	Section 1968.2 PVE (j)(2) Deadline	Section 1968.2 PVE (j)(3) Deadline
HABCDE02.0FGH	1/1/2017	2/1/2017	3/1/2017	7/1/2017	2/1/2018
HABCDE02.1FGH	1/1/2017	2/1/2017	3/1/2017	7/1/2017	2/1/2018
HABCDE02.2FGH	3/1/2017	4/1/2017	5/1/2017	9/1/2017	4/1/2018
HABCDE02.3FGH	3/1/2017	4/1/2017	5/1/2017	9/1/2017	4/1/2018
HABCDE02.4FGH	5/1/2017	6/1/2017	7/1/2017	11/1/2017	6/1/2018
HABCDE03.0FGH	5/1/2017	6/1/2017	7/1/2017	11/1/2017	6/1/2018

2017MY Test Groups and OBD II Phase-In Requirements

Test Group	Section 1968.2(d)(4.3.2)(D): Input component temperature sensor and engine cooling system input component rationality monitors	Section 1968.2(d)(4.5.5): Numerator/Denominator Disablement	Section 1968.2(e)(4.2.8)(C)(ii): Evaporative System High-Load Purge Flow Monitor	Section XXX
HABCDE02.0FGH				
HABCDE02.1FGH				
HABCDE02.2FGH				
HABCDE02.3FGH				
HABCDE02.4FGH				
HABCDE03.0FGH				
HABCDE02.5FHJ	X	X		
HABCDE03.2FHJ	X	X		

B. Checklist

STATE OF CALIFORNIA
California Environmental Protection Agency
AIR RESOURCES BOARD
ECARSD/OBD-113 (REV. 8/16)

OBD II Gasoline Monitoring Requirements Checklist

Component/ System	List the DTC of the monitor that detects the following failure mode: MONITORING REQUIREMENTS:											
Catalyst	(e)(1.2.2) or (e)(1.2.3) Conversion Efficiency											
Heated Catalyst	(e)(2.2) Heating Performance											
Misfire	(e)(3.2.1) Catalyst Damage Misfire	(e)(3.2.2) Emission Threshold: First 1000 revs	(e)(3.2.2) Emission Threshold: 4 x 1000 revs	(e)(3.2.3)(A) Plug-in Hybrid Percentage of Misfire >=2%	(e)(3.2.3)(B) Plug-in Hybrid Emission Threshold in Lieu of Percentage of Misfire >=2%							
Evaporative System	(e)(4.2.2)(A) Purge Flow	(e)(4.2.2)(B) 0.040" Leak Check	(e)(4.2.2)(C) 0.020" Leak Check	(e)(4.2.2)(D) High-load Purge Line Flow	(e)(4.2.5) 0.090" Leak Check in Lieu of 0.040"							
Secondary Air	(e)(5.2.3)(B) Insufficient Flow Emission Threshold	(e)(5.2.3)(D) Insufficient Flow Functional Monitor In Lieu of Emission Threshold										
Fuel System	(e)(6.2.1)(A) Emission Threshold	(e)(6.2.1)(B) Secondary Fuel Trim Emission Threshold	(e)(6.2.1)(C) Air-fuel Ratio Cylinder Imbalance Emission Threshold	(e)(6.2.2) Adaptive Limits Reached	(e)(6.2.3) Secondary Fuel Trim Adaptive Limits Reached	(e)(6.2.4) Fails to Enter Closed Loop						
Upstream Exhaust Gas Sensor	(e)(7.2.1)(A) Emission Threshold	(e)(7.2.1)(B) Open Circuit	(e)(7.2.1)(B) Out-of-Range High	(e)(7.2.1)(B) Out-of-Range Low	(e)(7.2.1)(C) Feedback: Slow/fails to Enter, Default OL	(e)(7.2.1)(D) Sufficient for Other Diagnostics	(e)(7.2.3)(A) Heater Performance	(e)(7.2.3)(B) Heater Circuit Continuity				
Downstream Exhaust Gas Sensor	(e)(7.2.2)(A) Emission Threshold	(e)(7.2.2)(B) Open Circuit	(e)(7.2.2)(D) Out-of-Range High	(e)(7.2.2)(D) Out-of-Range Low	(e)(7.2.2)(C) Sufficient for Other Diagnostics	(e)(6.2.4) Feedback: Slow/fails to Enter Closed Loop	(e)(7.2.2)(E) Feedback: Default OL	(e)(7.2.3)(A) Heater Performance	(e)(7.2.3)(B) Heater Circuit Continuity			
EGR	(e)(8.2.1) Low Flow Emission Threshold	(e)(8.2.3) Low Flow Functional Monitor in Lieu of Emission Threshold	(e)(8.2.2) High Flow Emission Threshold	(e)(8.2.4) High Flow Functional Monitor in Lieu of Emission Threshold								
Positive Crankcase Ventilation	(e)(9.2.2) Disconnection	(e)(9.2.3) Phase-in Disconnection or Break										

Engine Cooling System	(e)(10.2.1)(A) Time or Time Equivalent to Reach Threshold Temperature	(e)(10.2.1)(B) ECT Drops Below Threshold Temperature	(e)(10.2.2)(A) ECT Open Circuit	(e)(10.2.2)(A) ECT Out-of-Range High	(e)(10.2.2)(A) ECT Out-of-Range Low	(e)(10.2.2)(B) Time to Reach Closed Loop Enable Temperature	(e)(10.2.2)(C) ECT Stuck Below Highest Minimum Enable Temperature	(e)(10.2.2)(D) ECT Stuck Above Lowest Maximum Enable Temperature				
Cold Start Strategy	(e)(11.2.2)(A) Single Element/ Component Functional Monitor	(e)(11.2.2)(B) Individual Element/ Component or System Emission Threshold										
A/C System	(e)(12.2.1)(A) or (B) A/C Emission Threshold	(e)(12.2.1)(C) A/C Functional Monitor in Lieu of Emission Threshold										
VVT System	(e)(13.2.1) Target Error Emission Threshold	(e)(13.2.3) Target Error Functional Monitor in Lieu of Emission Threshold	(e)(13.2.2) Slow Response Emission Threshold	(e)(13.2.3) Slow Response Functional Monitor in Lieu of Emission Threshold								
Direct Ozone Reduction (DOR) System	(e)(14.2.1)(A) Functional Monitor for <=50% NMOG Std Credit	(e)(14.2.1)(B) Emission Threshold Monitor for >50% NMOG Std Credit	(e)(14.2.2)(A) Functional Monitor for <=5mg/mi NMOG Credit	(e)(14.2.2)(B) Emission Threshold for >5mg/mi NMOG Credit								
Hybrid Components	(e)(15.2.3)(A)(i) ESS State of Health	(e)(15.2.3)(A)(ii) ESS State of Charge	(e)(15.2.3)(A)(iii) ESS Cell Balancing Functional Response	(e)(15.2.3)(B)(i) ESS Thermal Management System	(e)(15.2.3)(B)(ii) Inverter Thermal Management System	(e)(15.2.3)(C) Regenerative Braking	(e)(15.2.3)(D) Drive Motor	(e)(15.2.3)(E) Generator	(e)(15.2.3)(F) Plug-in Hybrid Electric Vehicle ESS Charger			

	List the DTC of comprehensive component monitor that detects the following failure mode:											
Monitor/System	Input Out-of-Range High	Input Out-of-Range Low	Input Open Circuit	Input Rationality Low	Input Rationality High	Input Other Rationality	Digital Input Communication Loss/Errors	Output Functional	Output Shorted High	Output Shorted Low	Output Open Circuit	Digital Output Communication Loss/Errors
[Insert name of Comprehensive Component #1] *(e.g., barometric pressure sensor, MAF sensor, etc.)*												
[Insert name of Comprehensive Component #n]												

Note: This sheet is partially locked. You are not allowed to modify rows 1-4, nor add columns, edit column or row labels. You can insert as many rows as needed to provide more lines of data for comprehensive components.

Please use the latest versions of the OBD II monitor checklists. They can be found at the ARB OBD website here:
OBD II gasoline checklist: https://www.arb.ca.gov/msprog/obdprog/obdii_gas_monitor_checklist.xls
OBD II diesel checklist: https://www.arb.ca.gov/msprog/obdprog/obdii_diesel_monitor_checklist.xls

C. Summary Table

Summary Table

Test Group 7ARBV05.0XYZ		**Certification Standard** (ULEVII, SULEV, etc…)						
Component/ System	**Fault Code**	**Monitor Strategy Description**	**Malfunction Criteria**	**Threshold Value**	**Secondary Parameters**	**Enable Conditions**	**Time Required**	**MIL illum.**
(example) Catalyst	P0420	oxygen storage	rear oxygen sensor period vs. front oxygen sensor period	> .75 disable conditions:	engine speed engine load ECT MAP fuel system status MIL not illuminated for DTCs:	1000<rpm<4000 >20% >70C > 25 kPa closed loop P0139 P0105 P0133	20 seconds once per trip	two trips
EGR System	P0401	difference in MAP readings	delta MAP	< 10 kPa disable conditions:	vehicle speed ECT fuel system status battery voltage MIL not illuminated for DTCs:	> 35 mph > 70C fuel-cut > 11.0 volts P0105	3 seconds	two trips
Manifold Absolute Pressure (MAP) Sensor:								
MAP High	P0108	Out of Range High	MAP Voltage	> 4.0 V (110 kPa)	Engine Speed	> 300 rpm	Continuous	one trip
MAP Low	P0107	Out of Range Low	MAP Voltage	< 0.15 V (15 kPa)	Engine Speed	> 300 rpm	Continuous	one trip
MAP Rationality	P0106	Comparison of modeled MAP to actual MAP signal	High Rationality MAP Voltage:	< 3.1 (65 kPa)	Engine Speed Vehicle Speed calculated load	1000 to 5000 > 10 mph > 50%	2 seconds Monitor runs whenever enable conditions are met	two trips
			Low Rationality MAP Voltage:	> 1.0 (25 kPa)	Engine Speed Vehicle Speed Fuel System Status	> 1500 > 10 mph Fuel Cut		

D. Durability Demonstration Vehicle (DDV) Data

For test groups selected for DDV testing under section 1968.2(h), include all the demonstration testing information required under section 1968.2(i)(2.4).

For test groups not selected for DDV testing under section 1968.2(h), include a statement indicating this.

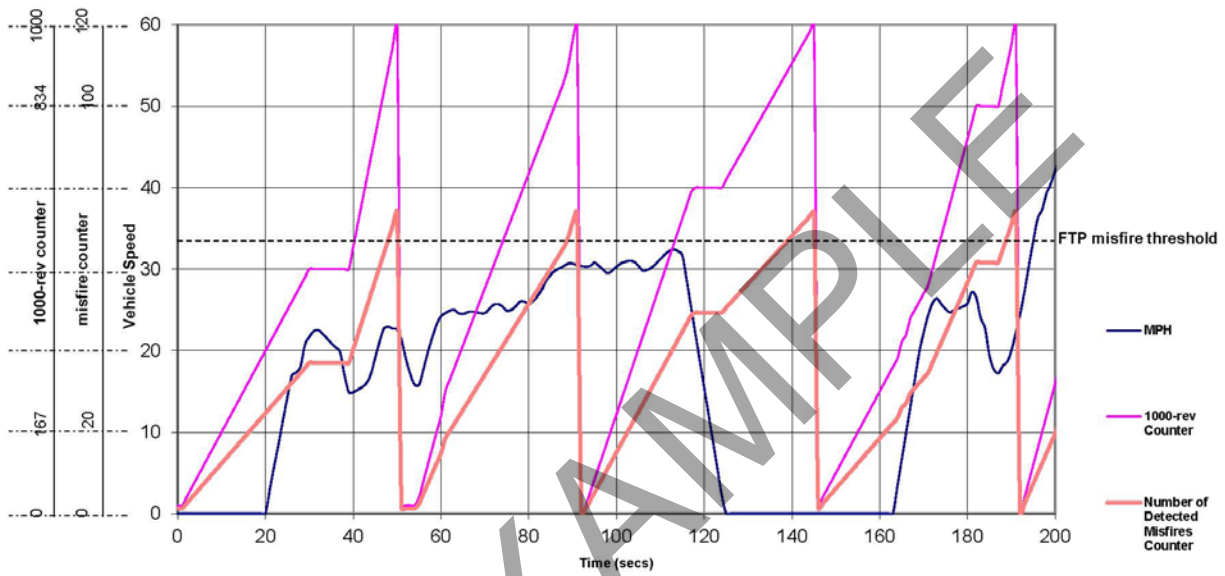
Example: **This Test Group was not selected for Durability Demonstration Testing for the 2017 Model Year.**

E. Misfire Catalyst Damage, Disablement and Detection Charts, Probability of Detection (POD) Charts

Misfire Catalyst Damage: For gasoline vehicles, include support data demonstrating the established percentage of misfire that can be tolerated without damaging the catalyst over the full range of engine speed and load conditions.

For all applicable vehicles, submit the misfire disablement and detection charts and POD charts. Examples of such charts are provided below.

Attachment A:
Misfire Disablement and Detection Chart



Note: Misfire data in this sample chart was collected during light-duty FTP vehicle chassis dynamometer testing.

Number of 1000-revs completed during test (1372 secs): ____
Number of 1000-revs where number of detected misfires exceeded threshold: ____

Probability of Detection Chart

Misfire Pattern: One Cylinder Out

Engine Speed (rpm)

Calculated Load (%)	Idle	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	Redline
Zero Torque	1.00	1.00	1.00	1.00	1.00	1.00	NR	NR	NR	NR	NR	NR	NR
15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	NR	NR	NR	NR	NR	NR
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	NR
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	NA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
WOT	NA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

NA Not Achievable
NR Not Required per 1968.2 Section (e)(3.3.1)(C)

F. Applicable Test Cycle and Adjustment Factor for each Monitor

For gasoline and diesel vehicles, indicate which monitor(s) run on the FTP cycle and which monitor(s) run on the Unified cycle.

If a monitor does not run and complete during the FTP and Unified cycles, indicate the alternate test cycle or driving conditions during which the monitor runs and completes.

Example:

All monitors run on the FTP cycle except for the following monitors:

Monitor	Fault Code	Test Cycle/Driving Conditions during which the monitor runs
Monitor A	P0XXX	Unified cycle
Monitor B	P1XXX	When conditions 1) through 3) are met for >XX seconds: 1) vehicle speed > XX mph 2) engine speed >XXXX rpm 3) intake air temperature > XX degrees Celsius
Monitor C	P2XXX	Highway cycle

For diesel vehicles with engines certified to an engine dynamometer standard, indicate which test cycle and standard (FTP or SET) is more stringent for each applicable emission threshold-based monitor and the corresponding adjustment factors in accordance with sections 1968.2(d)(6.1) and (6.2).

Adjustment Factors for Each Monitor

Threshold/Functional Monitor	D [1] (mile)	d [2] (mile)	F [3]	EF_L [4]				EF_H [5]				UAF [6]				Comments
				NOx (g/mile)	NMOG (g/mile)	CO (g/mile)	PM (g/mile)	NOx (g/mile)	NMOG (g/mile)	CO (g/mile)	PM (g/mile)	NOx (g/mile)	NMOG (g/mile)	CO (g/mile)	PM (g/mile)	
Baseline	200	11.04	0.052	0.139	0.007	0.100	0.000	0.464	0.059	0.134	0.001	0.017	0.003	0.002	0.0001	
EGR System High Flow	130	11.04	0.078	0.102	0.095	3.6	0.004	0.522	0.167	4.8	0.010	0.033	0.006	0.094	0.0005	
EGR System Low Flow	200	11.04	0.052	-	-	-	-	-	-	-	-	0.017	0.003	0.002	0.0005	Failure does not increase F or EF_H - so baseline UAF used. (Note: Provide engineering analysis justifying the use of baseline UAF.)

Note:

1. D is the average distance between regenerations
2. d is the distance to complete a regeneration
3. F is the frequency of regeneration; $F = \frac{d}{average\ distance\ between\ regenerations\ (D) + d}$
4. EF_L are the measured emissions during a test without regeneration event
5. EF_H are the measured emissions during a test with regeneration event
6. UAF = upward adjustment factor = $(F)(EF_H - EF_L)$

The following information should be provided:

How was F calculated? Manufacturers should identify the cycle that was used including the distance, time, and/or soot model.

How was EF_L calculated? Manufacturers should provide detailed information (e.g. was it based on multiple hot-start FTP72 or FTP75 ? Was cold-start FTP72 or FTP75 used?).

How was EF_H calculated? Manufacturers should provide detailed information (e.g. was it based on multiple hot-start FTP72 or FTP75? Was cold-start FTP72 or FTP75 used?).

G. Input Output Signals List

Engine Plug Module 1		
Pin	Signal	OBD
1	Oxygen sensor in front of catalyst, left bank (trim-resistor)	x
2	Signal oxygen sensor inside catalyst, left bank	x
3	Oxygen sensor in front of catalyst, right bank (virtual ground)	x
4	Sensor-ground 1	x
5	Sensor-ground 2	x
6	Hot-film air-mass sensor 1 (sensor-ground)	x
7	Hot-film air-mass sensor 2	x
8	Signal intake-air temperature	x
9	Reserve switch-output 2	x
10	Intake manifold changeover valve	x
12	Fuel injector power stage 2	x
13	Fuel injector power stage 1	x
14	Outlet camshaft actuator	x
15	Oxygen sensor heater	x

H. Closed Loop Description

Include a written description of all parameters and conditions necessary to begin closed loop operation.

I. Diagnostic Link Connector (DLC) Location and Connector Picture

J. Positive Crankcase Ventilation (PCV)/Crankcase Ventilation (CV) System Description

Include pictures and/or diagrams of the PCV/CV system, including all PCV/CV system connections, and corresponding fault codes stored when a disconnection occurs.

K. Auxiliary Emission Control Device (AECD) and Emission-Increasing AECD (EI-AECD) Descriptions

Provide statement indicating the document containing the AECD/EI-AECD descriptions have been submitted to On Road Certification.

Example: **AECD/EI-AECD descriptions have been submitted to On Road Certification section. Please refer to the document uploaded to the On Road Certification domain on DMS.**

The AECD document should include, but is not limited to, the following strategies:

- Default actions
- Adaptations
- Intrusive OBD monitors

The AECD document should also include identification of each EI-AECD relative to the data required to be tracked and reported in the standardized format specified in section 1968.2(g)(6). The document should specifically identify which SAE J1979 Parameter IDs (PIDs) are used to track each of the EI-AECDs and, if applicable, what criteria was used to determine when to track time under Timer 1 versus under Timer 2 per the OBD regulation and SAE J1979 specifications.

See example on next page.

Example: Table 1 EI-AECD PID Tracking Table

SAE J1979 PID	PID Name	Data Bytes Supported?	Manufacturer identification of EI-AECD being tracked
$81	**Engine Run Time for AECD #1 - #5**		
	Total run time with EI-AECD #1 Timer 1 active		
	Total run time with EI-AECD #1 Timer 2 active		
	Total run time with EI-AECD #2 Timer 1 active	x	"Engine overheat protection based on engine coolant temperature" (see section X.XXX in application)
	Total run time with EI-AECD #2 Timer 2 active	x	"Engine overheat protection based on engine coolant temperature" (see section X.XXX in application)
	Total run time with EI-AECD #3 Timer 1 active		
	Total run time with EI-AECD #3 Timer 2 active		
	Total run time with EI-AECD #4 Timer 1 active	x	"Catalyst temperature protection" (see section Y.YYY) in application)
	Total run time with EI-AECD #4 Timer 2 active		
	Total run time with EI-AECD #5 Timer 1 active		
	Total run time with EI-AECD #5 Timer 2 active		
$82	**Engine Run Time for AECD #6 - #10**		
	Total run time with EI-AECD #6 Timer 1 active		
	Total run time with EI-AECD #6 Timer 2 active		
	Total run time with EI-AECD #7 Timer 1 active		
	Total run time with EI-AECD #7 Timer 2 active		
	Total run time with EI-AECD #8 Timer 1 active		
	Total run time with EI-AECD #8 Timer 2 active		
	Total run time with EI-AECD #9 Timer 1 active		
	Total run time with EI-AECD #9 Timer 2 active		
	Total run time with EI-AECD #10 Timer 1 active		
	Total run time with EI-AECD #10 Timer 2 active		

L. Malfunction Indicator Light (MIL) Location and Image

M. Standardization Data

Communication Protocol: ISO 15765-4

OBD Test Results: Include test results required to be made available under section (g)(4.5)

On-Board Diagnostic Monitor ID Name	Monitor ID (MID)	Test ID Name	Test ID (TID)	Min. Value[1]	Max. Value[1]	Unit	Monitor Fault Code(s)
Catalyst Bank 1	21	Oxygen storage	AA	0	300	-	P0420
Exhaust Gas Sensor Bank 1 Sensor 1	01	Rich to lean response rate	AB	0	0.6	sec	P014C
		Lean to rich response rate	AC	0	0.6	sec	P014D
		Rich to lean delayed response	AD	0	0.4	sec	P015A
		Lean to rich delayed response	AE	0	0.4	sec	P015B
		Range	AF	0.2	4.7	Volts	P0131, P0132

Footnote 1: For monitors with multiple min/max values (different values based on different driving conditions), only one set of min/max values is required to be included in the table - the table should include a statement indicating the monitor has multiple min/max values and a description of the specific conditions for the min/max values shown in the table (e.g., min/max value when ambient temperature is 25 degrees Celsius).

In-use Monitor Performance Numerator/Denominator Information

INFOTYPE	$08		
Monitor	**Monitor Fault Code(s)**	**Numerator Incrementing Specifications**	**Denominator Incrementing Specifications**
Catalyst Bank 1	P0420	EWMA monitor Fast initial response strategy - after code clear event, numerator increment one time for first time after catalyst monitor enable conditions met 3 times (when monitor can make first pass/fail decision). Else, numerator increment one time after each time catalyst monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(B) met.
Primary Oxygen Sensor Bank 1	P014C	Increment one time each time primary oxygen sensor monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(B) met.
	P014D	Increment one time each time primary oxygen sensor monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(B) met.
	P015A	Increment one time each time primary oxygen sensor monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(B) met.
	P015B	Increment one time each time primary oxygen sensor monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(B) met.

In-use Monitor Performance Numerator/Denominator Information (cont.)

Monitor	Monitor Fault Code(s)	Numerator Incrementing Specifications	Denominator Incrementing Specifications
NMHC Catalyst	P0420	EWMA monitor Fast initial response strategy - after code clear event, numerator increment one time for first time after catalyst monitor enable conditions met 3 times (when monitor can make first pass/fail decision). Else, numerator increment one time after each time catalyst monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(G) met.
PM Filter Bank 1	P2002	Increment one time each time monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(G) met.
	P2459	Increment one time each time monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(H) met, which include all following conditions: 1) criteria under section 1968.2(d)(4.3.2)(B) met, and 2) cumulative mileage >= XX miles.
	P24A2	Increment one time each time monitor enable conditions met.	Increment after criteria in section 1968.2(d)(4.3.2)(I) met.

N. Non-MIL/Non-OBD Components

See next few pages for example templates for:

- Safety-Only Components/Systems
- Emissions Neutral Diagnostics
- Components not monitored by OBD II system

Safety-Only Components/Systems

Compliance Statement: The following component/systems listed in the table below are designed and implemented specifically for safety. Any non-safety use or function will not impact emissions or OBD system performance in any way.

Component/System	Safety Function	All Non-Safety Functions
Lane Departure Control System	This system is designed to warn the driver when the vehicle begins to move out of its lane due to driver error, distractions, or drowsiness. The system uses a camera mounted on the windshield to track road markings and determine if the vehicle is drifting over any lane marking. If this is detected, the steering wheel will vibrate to warn the driver and the vehicle will use the vehicle stability control system to help the vehicle stay within the lane. A malfunction of the lane departure control system may incorrectly activate the vehicle stability control system and affect OBD monitor performance. Specifically, a malfunction can prevent certain speed/load conditions from being met, which may prevent the catalyst monitor and oxygen sensor monitors from running.	None

Emissions Neutral Diagnostics

Component/ System	Function	Conditions under which component/system used	Diagnostic(s) affected by component/system usage or diagnostics	Emissions neutral default action description and associated diagnostic(s)	Effect on emissions/OBD system if emissions neutral default action not activated	ASIL C/D control unit name and supplier
Steering angle sensor	Input from sensor prevents undesired operation of engine start-stop technology while the vehicle is turning (e.g. during parking).	When steering angle sensor signal change is greater than 45 degrees per second, engine start-stop system is prevented from functioning.	None	When a sensor malfunction (i.e., sensor circuit high, circuit low, open circuit, or stuck sensor malfunction) is detected (details of the corresponding diagnostics provided in the summary tables), the vehicle stops using the sensor signal when determining whether or not to prohibit the operation of the engine start-stop system. The effect would be that steering angle input would no longer be able to inhibit the start-stop function. List of corresponding diagnostics that activate the emissions neutral default action: PXXX1, PXXX2, PXXX3	When the steering angle sensor malfunctions and the emissions neutral default action is activated, the engine stop-start system is still able to activate when the vehicle comes to a stop. When the steering angle sensor malfunctions and the emissions neutral default action is not activated, the engine stop-start system is disabled, so the engine will turn on during idle and consequently, emissions will increase. Emissions on FTP cycle when emissions neutral default action activated: NMOG+NOx: 0.01 mg/mile CO: 1.0 mg/mile Emissions on FTP cycle when emissions neutral default action not activated: NMOG+NOx: 0.03 mg/mile CO: 2.1 mg/mile	N/A

Components not monitored by OBD II system due to emission test-out criteria under section 1968.2(e)(15.1.2), (e)(15.2.3)(I), (f)(15.1.2), or (f)(15.2.3)(I)

		Emission Data				Integrated Net Energy Data	
		FTP Standard	FTP test (1968.2(e)(15.1.2)(B)(ii)a. or (f)(15.1.2)(B)(ii)a.)	Worst case test cycle (1968.2(e)(15.1.2)(B)(ii)b. or (f)(15.1.2)(B)(ii)b.)		Each Applicable Test Cycle (FTP, US06, HWFET, and/or Unified) or Alternate Test	
Component	**Engineering Analysis and/or Data**		**W/ Fault**	**No Fault**	**W/ Fault**	**W/ Fault**	**No Fault**
Component 1	Information to include description of the function of Component 1. <u>If Component 1 is NOT a hybrid component on a plug-in hybrid electric vehicle:</u> Include description of worst case configuration (i.e., the test cycle that results in worst case emissions) and how it was determined, and descriptions of test cycles used to stabilize the system. If Component 1 does not function during the FTP, 50°FTP, HWFET, SC03, US06, and Unified cycles, include description of the alternate test cycle/vehicle operating conditions and supporting data/engineering evaluation in accordance with section 1968.2(e)(15.1.2)(A)(ii)b. or (f)(15.1.2)(A)(ii)b. Fill in required information/data under "Emission Data" columns. <u>If Component 1 is a hybrid component on a plug-in hybrid electric vehicle:</u> Include information about whether or not the engine started and the integrated net energy data on the FTP, HWFET, Unified, and US06 cycles in accordance with section 1968.2(e)(15.2.3)(I)(ii) or (f)(15.2.3)(I)(ii). If Component 1 does not function during any of these cycles, include description of the alternate test cycle/vehicle operating conditions and supporting data/engineering evaluation in accordance with section 1968.2(e)(15.2.3)(I)(iv) or (f)(15.2.3)(I)(iv). If Component 1 is part of the hybrid thermal management system, include information about the alternate test cycle/driving conditions in accordance to section 1968.2(e)(15.2.3)(I)(iii) or (f)(15.2.3)(I)(iii). Fill in required information/data under "Integrated Net Energy Data" columns.						
Component 2							

List of components not monitored by OBD II system due to criteria under sections 1968.2(e)(17.8), (e)(17.9), (f)(17.7), or (f)(17.8)

Component A
Component B
Component C
etc.

O. Inducement Strategies Descriptions

Provide statement indicating the document containing the inducement strategies descriptions have been submitted to On Road Certification.

Example: **Inducement strategies descriptions have been submitted to On Road Certification section. Please refer to the document named "XXX" uploaded to the On Road Certification domain on DMS.**

P. Certification Documentation Remainder

Gasoline Adjustment Factors

The same adjustment factor descriptions submitted to ARB On Road Certification staff for review need to be submitted to ARB OBD staff for review. This should include the adjustment factor(s) established for tailpipe certification and data/information used to determine the adjustment factor(s).

Active Off-Cycle Credit Technologies

Fill out the attached Table 1 "Active Off-Cycle Tracking Support" identifying which SAE J1979 InfoTypes are used to track each of the technologies. Include for each technology:

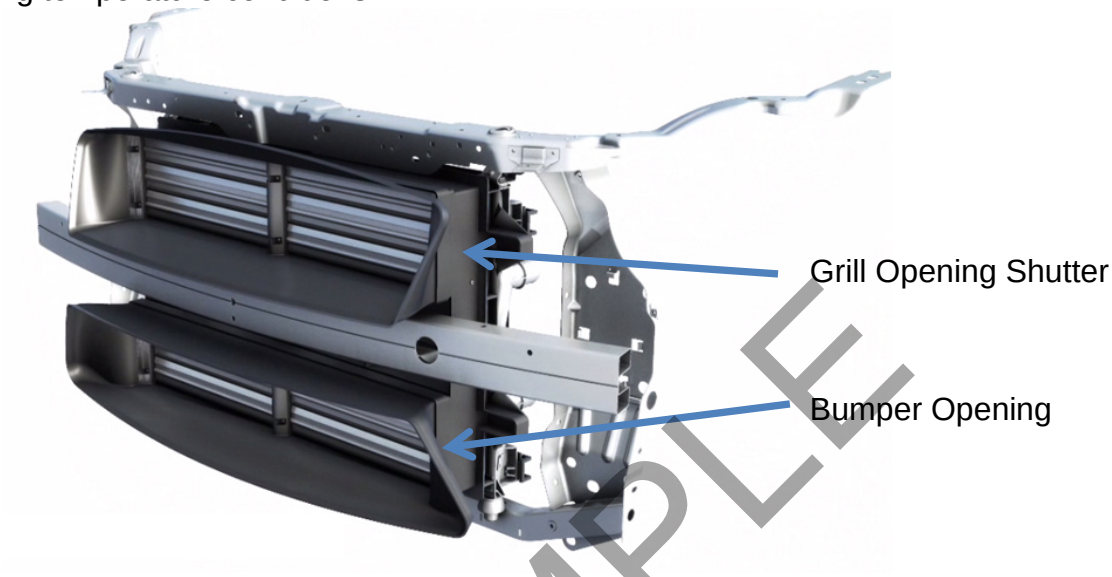
1) a written description of the technology,
2) the identification of the technology relative to the data required to be tracked and reported under section 1968.2(g)(6) (e.g., Active Off-Cycle Credit Tech #1 is "haptic-feedback accelerator pedal"),
3) the sensor signals and/or calculated values used to activate the technology, and
4) the driver action (if any) required to activate the technology.

Example:

Description:
Active grill shutters are used to reduce aerodynamic drag during driving conditions by partially or fully closing the airflow openings in the front of the vehicle for radiator or other heat exchanger cooling.

For this system, there are two separate grill shutters. The first is located in the typical radiator or grill opening at the front of the vehicle and can be commanded to any intermediate position between fully open and fully closed with a variable position control system. The second is located in a bumper opening and is separately controlled. The bumper opening grill shutter is a two position system that can only be commanded to fully open or fully closed position.

Control of the shutters is based primarily on a calculation of engine cooling demand. When reduced cooling needs are determined, the system closes one or both of the shutters as needed. Other considerations influencing the target position include a limitation on the commanded closed position to less than fully closed in potential freezing temperature conditions.



Tracking:
As noted in Table 1 Active Off-Cycle Tracking Support, the grill opening shutter is tracked as InfoType $1D: Active grille air shutter “A” and uses both Timer 1 and Timer 2 as the system can command a varying shutter position between open and closed. Timer 1 is incremented whenever the shutter is commanded to a position that is partially closed but less than 75% of the maximum commanded closed position. Timer 2 is incremented whenever the commanded position is 75% or more of the maximum commanded closed position.

The bumper opening shutter is tracked as InfoType $1D: Active grille air shutter “B” and uses only Timer 1 as the system can only command fully open or fully closed. Timer 1 is incremented whenever the shutter is commanded to the fully closed position.

Activation:
The control strategy is based on engine cooling demand and uses the following sensed parameters in the calculation of the commanded grill shutter position as a function of engine cooling demand:
Engine coolant temperature, intake air temperature, vehicle speed, throttle position, and A/C evaporator outlet temperature.

Vehicle driver action:
The grill shutters are controlled independently of the vehicle driver. No direct action by the driver influences the operation of the system.

Table 1 Active Off-Cycle Tracking Support

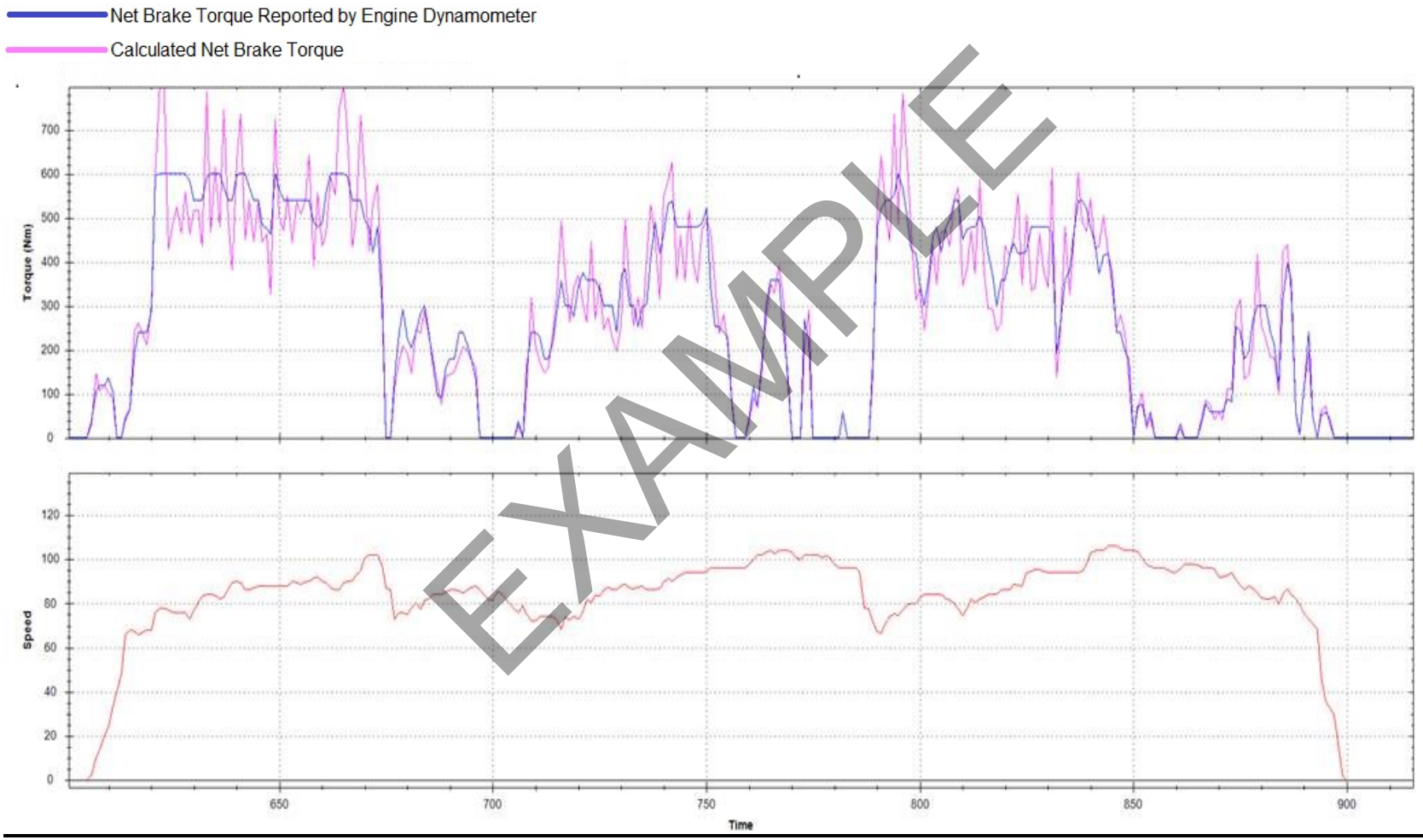
SAE J1979 InfoTypeID	InfoType Name	InfoType Supported?	Manufacturer identification of technology
$1D	Active Aerodynamic Features #1 Off-cycle Credit Vehicle Data		
	Active Grille Air Shutter "A" Timer 1 (Recent)	x	Grill opening shutter
	Active Grille Air Shutter "A" Timer 2 (Recent)	x	Grill opening shutter
	Active Grille Air Shutter "A" Timer 1 (Lifetime)	x	Grill opening shutter
	Active Grille Air Shutter "A" Timer 2 (Lifetime)	x	Grill opening shutter
	Active Grille Air Shutter "B" Timer 1 (Recent)	x	Bumper opening shutter
	Active Grille Air Shutter "B" Timer 2 (Recent)		
	Active Grille Air Shutter "B" Timer 1 (Lifetime)	x	Bumper opening shutter
	Active Grille Air Shutter "B" Timer 2 (Lifetime)		
$1E	Active Aerodynamic Features #2 Off-cycle Credit Vehicle Data		
	Vehicle Ride Height Control Timer 1 (Recent)		
	Vehicle Ride Height Control Timer 2 (Recent)		
	Vehicle Ride Height Control Timer 1 (Lifetime)		
	Vehicle Ride Height Control Timer 2 (Lifetime)		
$1F	Active Aerodynamic Features #3 Off-cycle Credit Vehicle Data		
	Active Aerodynamic Feature #1 Timer 1 (Recent)		
	Active Aerodynamic Feature #1 Timer 2 (Recent)		
	Active Aerodynamic Feature #1 Timer 1 (Lifetime)		
	Active Aerodynamic Feature #1 Timer 2 (Lifetime)		
	Active Aerodynamic Feature #2 Timer 1 (Recent)		
	Active Aerodynamic Feature #2 Timer 2 (Recent)		
	Active Aerodynamic Feature #2 Timer 1 (Lifetime)		
	Active Aerodynamic Feature #2 Timer 2 (Lifetime)		
0x21	Driver-Selectable Operating Modes Off-cycle Credit Vehicle Data		
	"Eco" Driver-Selectable Mode Timer (Recent)		
	"Eco" Driver-Selectable Mode Timer (Lifetime)		
	Driver-Selectable Mode Timer 1 (Recent)		
	Driver-Selectable Mode Timer 1 (Lifetime)		
	Driver-Selectable Mode Timer 2 (Recent)		
	Driver-Selectable Mode Timer 2 (Lifetime)		
	Driver-Selectable Mode Timer 3 (Recent)		
	Driver-Selectable Mode Timer 3 (Lifetime)		
	Driver-Selectable Mode Timer 4 (Recent)		
	Driver-Selectable Mode Timer 4 (Lifetime)		
$22	Run Time for Stop-Start and Coasting Off-cycle Credit Vehicle Data		
	Idle Stop-Start Timer (Recent)		

SAE J1979 InfoTypeID	InfoType Name	InfoType Supported?	Manufacturer identification of technology
	Idle Stop-Start Timer (Lifetime)		
	Engine Running Coasting Timer (Recent)		
	Engine Running Coasting Timer (Lifetime)		
	Engine Off Coasting Timer (Recent)		
	Engine Off Coasting Timer (Lifetime)		
$23	Driver Coaching Technology Off-cycle Credit Vehicle Data		
	Driver Coaching Technology 1 Enabled Counter (Recent)		
	Driver Coaching Technology 1 Utilized Counter (Recent)		
	Driver Coaching Technology 1 Enabled Counter (Lifetime)		
	Driver Coaching Technology 1 Utilized Counter (Lifetime)		
	Driver Coaching Technology 2 Enabled Counter (Recent)		
	Driver Coaching Technology 2 Utilized Counter (Recent)		
	Driver Coaching Technology 2 Enabled Counter (Lifetime)		
	Driver Coaching Technology 2 Utilized Counter (Lifetime)		
	Driver Coaching Technology 3 Enabled Counter (Recent)		
	Driver Coaching Technology 3 Utilized Counter (Recent)		
	Driver Coaching Technology 3 Enabled Counter (Lifetime)		
	Driver Coaching Technology 3 Utilized Counter (Lifetime)		
$24	Active Powertrain Warm-up Features Off-cycle Credit Vehicle Data		
	Active Engine Warm-up Timer (Recent)		
	Active Engine Warm-up Timer (Lifetime)		
	Active Transmission Warm-up Timer (Recent)		
	Active Transmission Warm-up Timer (Lifetime)		
$25	Off-cycle Credit Technology #1 Vehicle Data		
	Active Off-Cycle Credit Technology #1 Timer 1 (Recent)		
	Active Off-Cycle Credit Technology #1 Timer 2 (Recent)		
	Active Off-Cycle Credit Technology #1 Timer 1 (Lifetime)		
	Active Off-Cycle Credit Technology #1 Timer 2 (Lifetime)		
$26	Off-cycle Credit Technology #2 Vehicle Data		
	Active Off-Cycle Credit Technology #2 Timer 1 (Recent)		
	Active Off-Cycle Credit Technology #2 Timer 2 (Recent)		
	Active Off-Cycle Credit Technology #2 Timer 1 (Lifetime)		
	Active Off-Cycle Credit Technology #2 Timer 2 (Lifetime)		
$27	Off-cycle Credit Technology #3 Vehicle Data		
	Active Off-Cycle Credit Technology #3 Timer 1 (Recent)		
	Active Off-Cycle Credit Technology #3 Timer 2 (Recent)		
	Active Off-Cycle Credit Technology #3 Timer 1 (Lifetime)		
	Active Off-Cycle Credit Technology #3 Timer 2 (Lifetime)		

SAE J1979 InfoTypeID	InfoType Name	InfoType Supported?	Manufacturer identification of technology
$28	Off-cycle Credit Technology #4 Vehicle Data		
	Active Off-Cycle Credit Technology #4 Timer 1 (Recent)		
	Active Off-Cycle Credit Technology #4 Timer 2 (Recent)		
	Active Off-Cycle Credit Technology #4 Timer 1 (Lifetime)		
	Active Off-Cycle Credit Technology #4 Timer 2 (Lifetime)		
$29	Off-cycle Credit Technology #5 Vehicle Data		
	Active Off-Cycle Credit Technology #5 Timer 1 (Recent)		
	Active Off-Cycle Credit Technology #5 Timer 2 (Recent)		
	Active Off-Cycle Credit Technology #5 Timer 1 (Lifetime)		
	Active Off-Cycle Credit Technology #5 Timer 2 (Lifetime)		

Net Brake Torque Data (for MD diesel vehicles certified to an engine dynamometer tailpipe emission standard)

FTP cycle example:



Any Other Information

Cold Start Emission Reduction Strategy (CSERS) Details

CSERS description

The CSERS uses spark retard and increased idle speed to accelerate warm-up of the catalyst. The strategy causes an increase in temperature of the exhaust gas exiting the cylinder which results in a faster warm-up of catalyst temperature. The strategy is enabled on cold starts and is activated until the catalyst has reached a minimum temperature necessary for good conversion efficiency.

CSERS enable/disable conditions

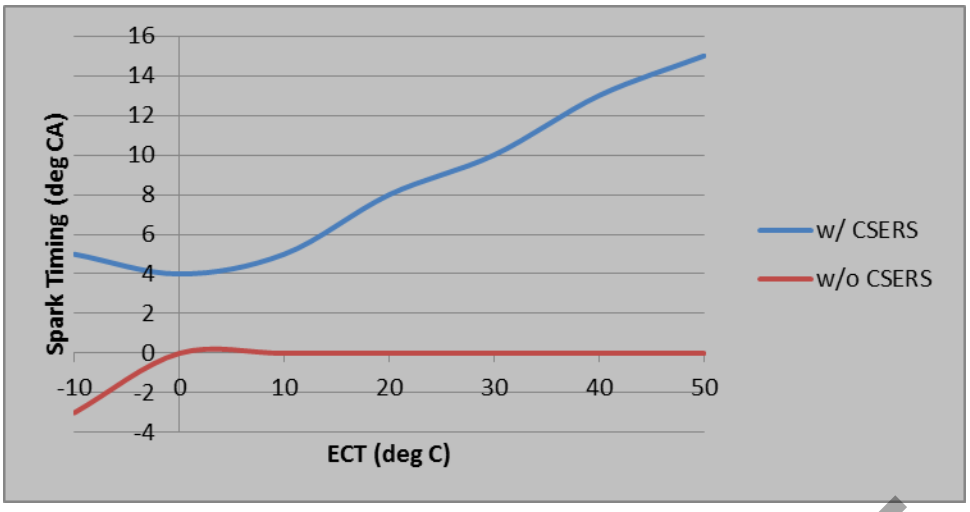
The strategy is activated when the engine coolant temperature (ECT) at start is between -10 and 50 degrees Celsius. Once active, the CSERS is considered complete and disabled for the rest of the driving cycle when modeled catalyst temperature (for the front catalyst) reaches 400 degrees Celsius.

While active, the CSERS will be disabled for the rest of the trip if throttle position is greater than 85% for more than 1.0 seconds or calculated engine load is greater than 75% for more than 1.0 seconds.

While active, the CSERS system will be temporarily disabled during gear shifts and while vehicle speed exceeds 80 mph. After the gear shift or when vehicle speed drops below 80 mph, the CSERS will be re-activated until the modeled catalyst temperature reaches the target value.

Actions taken when CSERS is active

The commanded spark timing while the CSERS is active is a function of ECT. The graph below shows the commanded spark timing while the CSERS is active and while the CSERS is inactive.



The commanded idle speed while the CSERS is active is 1200 rpm, while the base warmed-up idle speed in drive (for an automatic transmission vehicle) is 750 rpm.