



Potential Amendments to the California Phase 2 GHG Regulation and Update re: California Phase 2 GHG Trailer Certification

PUBLIC WORKSHOP

JULY 24, 2019

**Webcast Participants – Please e-mail
comments to the following address:**

sierrarm@calepa.ca.gov

Outline

Potential Amendments to the California Phase 2 GHG Regulation

- Phase 2 GHG Standards Background
- Potential Amendments to the California Phase 2 GHG Regulation
- Updates on California Phase 2 Air Conditioning Leakage Requirements
- Federal Phase 2 GHG Technical Amendments

Hybrid Powertrain Certification Testing Provisions

California Phase 2 GHG Trailer Certification

- Updates on California Phase 2 GHG Trailer Certification
- Preliminary Approval of Aero Devices
- Staff Contact Information

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Potential Amendments to the California Phase 2 GHG Regulation

▪Phase 2 GHG Standards Background

- Potential Amendments to the California Phase 2 GHG Regulation
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CA Phase 2 Background

- ❑ In 2016, U.S. EPA and NHTSA adopted the second phase of the GHG and fuel-efficiency standards for heavy-duty engines and vehicles including trailers
- ❑ CARB harmonized with federal Phase 2 program in February 2018
 - Manufacturer ability to certify in CA
 - CARB ability to enforce regulatory requirements
- ❑ Standards begin in 2020 MY for trailers, 2021 MY for engines, tractors, and vocational vehicles
 - Stringencies increase through 2027

Phase 2 GHG Structure (GVWR >8,500 lbs.)

Combination Tractors



Vocational Vehicles



Pickup Trucks and Vans



Trailers Pulled by
Combination
Tractors



NEW in
Phase 2!

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Certification Application Warranty Statement

- Add “Warranty requirements (sections 2035, et seq., title 13, CCR)” to the list of documents required to be submitted at time of certification
 - No changes to Phase 2 warranty requirements are being proposed with this amendment
 - Clarify the warranty requirements applicable to heavy-duty vehicles
 - This warranty statement requirement is already incorporated in the CA Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Year Heavy-Duty Diesel Engines and Vehicles

End of Year Reports

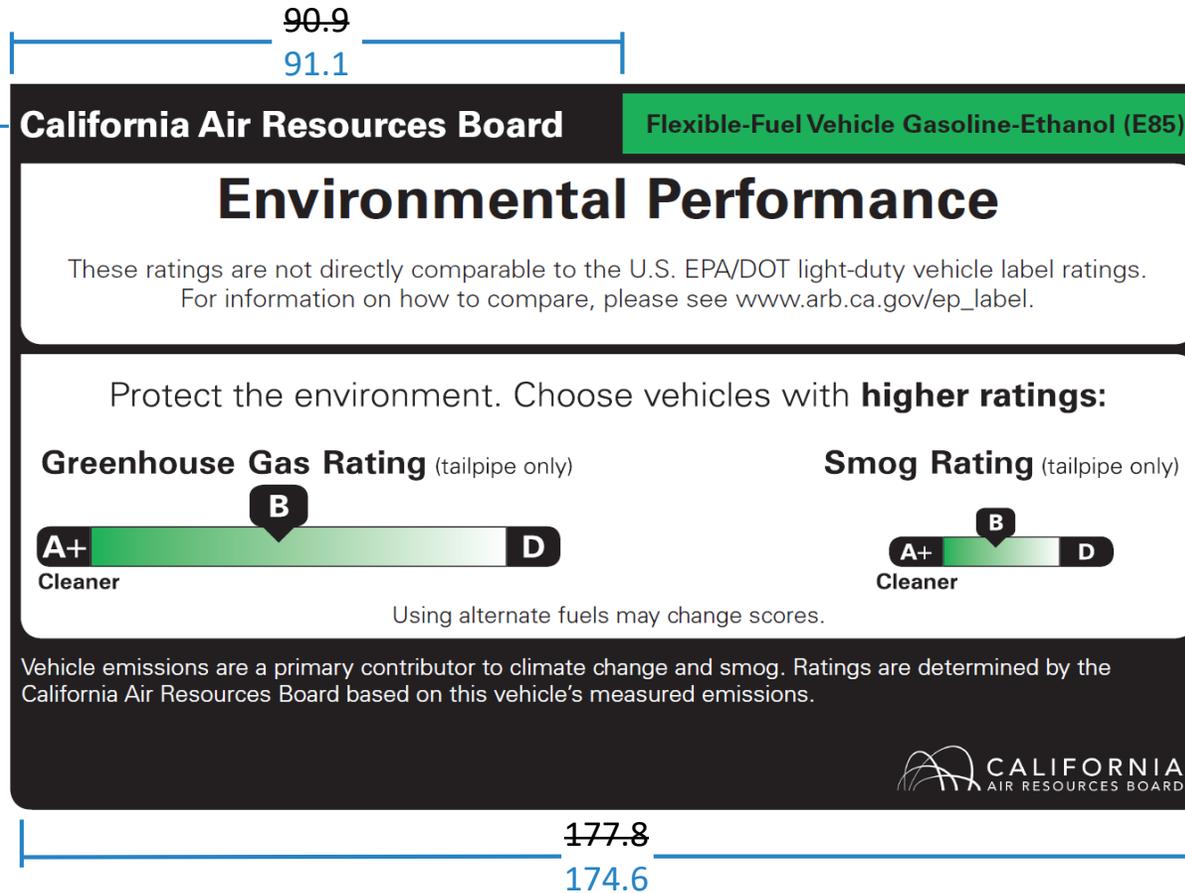
- ❑ Add a requirement in Reporting and Recordkeeping requirements (40 CFR 1037.250) to include the total CA-directed production volume of vehicles in the End of the Year Report
- ❑ Currently, only total U.S.-directed production volumes are required
 - The CA-specific data will be used to determine the level of manufacturer compliance, and to more effectively develop the heavy-duty vehicle emission inventory.

Environmental Performance Label Specification Changes

- Change the “California Air Resources Board” font size from “18pt” to “16pt” to fit in the space
- Add a new specification - must be centered vertically - to both California Air Resources Board and the vehicle’s fuel type
- Fix width specifications
- Revise sample labels previously provided to match the actual label specifications

Environmental Performance Label (cont.)

Centered Vertically,
16pt font



Centered Vertically

Manufacturers Advisory Correspondence (MAC) – Environmental Performance Label

- ❑ CARB anticipates releasing a Manufacturers Advisory Correspondence soon and will provide label with formatting specifications to help with compliance

California Air Resources Board

Environmental Performance

These ratings are not directly comparable to the U.S. EPA/DOT light-duty vehicle label ratings. For information on how to compare, please see www.arb.ca.gov/ep_label.

Protect the environment. Choose vehicles with **higher ratings**:

Greenhouse Gas Rating (tailpipe only)	Smog Rating (tailpipe only)
A+  D Cleaner	A+  D Cleaner

Vehicle emissions are a primary contributor to climate change and smog. Ratings are determined by the California Air Resources Board based on this vehicle's measured emissions.

 CALIFORNIA AIR RESOURCES BOARD

Typographical Fix

- 13 CCR Section 1965. Emission Control, Smog Index, and Environmental Performance Labels - 1979 and Subsequent Model-Year Motor Vehicles

CALIFORNIA ENVIRONMENTAL PERFORMANCE LABEL SPECIFICATIONS FOR 2021 AND SUBSEQUENT MODEL YEAR MEDIUM-DUTY VEHICLES, EXCEPT MEDIUM-DUTY PASSENGER VEHICLES

- Correct the reference from 40 CFR section “86.1803.01” to “86.1803-01” in the Worst-Case definition
 - **Section 4(a)** ...title 40, CFR, section 86.1803-01, as last amended October 25, 2016...

Excluded Trailers: Addition

- ❑ CA regulation originally aligned with 40 CFR 1037.5
- ❑ Provide the ability for the Executive Officer to exclude/exempt specific trailer configurations from meeting required emission standards when it is deemed that the technology is not currently available to meet the standard
 - Allows for future flexibility in case unexpected situations arise in the future as this regulation progresses

Excluded Trailers: Correction

- ❑ Correct the inconsistency of excluded trailers in the CA Phase 2 regulations and test procedures (i.e. MY 2020 rather than MY 2018 trailers)
 - Update effective date of certification requirements to CA effective date

Example: 1037.5 Excluded vehicles. October 25, 2016.

(h)(4) Trailers built before January 1, ~~2018~~2020.

Trailers: Clean Up Items

- ❑ 40 CFR 1037.515 Correct the greater than symbol for Bin VII, 1.80 m² measured delta CdA in the Table for Bin Determinations for Trailers Based on Aerodynamic Test Results

1037.515 Determining CO₂ emissions to show compliance for trailers. October 25, 2016.

TABLE 2 OF § 1037.515—BIN DETERMINATIONS FOR TRAILERS BASED ON AERODYNAMIC TEST RESULTS

If a trailer's measured ΔCdA is . . .	designate the trailer as . . .	and use the following value for ΔCdA
≤ 0.09	Bin I	0.0
0.10–0.39	Bin II	0.1
0.40–0.69	Bin III	0.4
0.70–0.99	Bin IV	0.7
1.00–1.39	Bin V	1.0
1.40–1.79	Bin VI	1.4
≥ 1.80	Bin VII	1.8



Trailers: Clean Up Items (cont.)

- ❑ Section 1037.801, delete the phrase “other than trailers” in the Vehicles definition

CALIFORNIA GREENHOUSE GAS EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2014 AND SUBSEQUENT MODEL HEAVY-DUTY VEHICLES

1037.801 Definitions. October 25, 2016.

Vehicle means equipment intended for use on highways that meets at least one of the criteria of paragraph (1) of this definition, as follows:

(2) ~~Vehicles other than trailers may be complete or incomplete vehicles...~~

- 40 CFR 1037.621 allows certificate holders to sell/ship incomplete vehicles to a secondary manufacturer who finalize the vehicle
- Revising “vehicle” definition clarifies that delegated assembly is an allowed process for all vehicles, including trailers.

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CA Phase 2 GHG Air Conditioning Leakage Requirements – Remaining Issues

- Certification responsibilities for “prep-package” versions of some vocational vehicles that involve both original and secondary manufacturers in A/C installation
 - The meaning of “Prep-package” is described in the Auto Alliance comment letter quoted in the last sub-bullet.
 - Certification responsibilities for “prep-package” versions of vehicles were not clarified in CARB Phase 2.
 - Auto Alliance public comment letter (February 5, 2018) to CARB Phase 2 rulemaking: *“... some manufacturers produce a “prep-package” version of vehicles with air conditioning for the cab, but connections that allow a rear air conditioning unit installed by a secondary manufacturer (e.g., recreational vehicle manufacturer). The original manufacturer would be responsible only for the air conditioning leakage of the prep-package. The secondary manufacturer would be responsible for the leakage of the complete air conditioning.”*

Update to CA Phase 2 GHG Air Conditioning Leakage Requirements - via Manufacturers Advisory Correspondence (MAC)

- Certification responsibilities for “prep-package” versions of some vocational vehicles that involve both original and secondary manufacturers in A/C installation
 - Original manufacturers must comply with CA Phase 2 A/C leakage requirements for A/C of the “prep-package” (i.e. prior to any alterations or additions by secondary manufacturers).
 - Original manufacturers must provide instructions to secondary manufacturers (e.g. via Incomplete Vehicle Documentation (IVD)).
 - Secondary manufacturers must follow IVD instructions to help ensure final completed vehicles meet A/C Leakage Standard.
 - CARB reserves the right to require secondary manufacturers to provide documentation to demonstrate compliance.

CA Phase 2 GHG Air Conditioning Leakage Requirements – Remaining Issues (cont.)

- Refrigerant leakage control demonstration method for large A/C systems (refrigerant charge > 3 kg, e.g. those in transit buses)
 - U.S. EPA Phase 2 A/C Leakage Standard (main provision): leak rate $\leq 1.50\%$ per year (leak rate is evaluated by SAE J2727)
 - U.S. EPA Phase 2 provision for large A/C systems: allow the use of “alternative means” to demonstrate equivalent refrigerant leakage control, in recognition of the much larger refrigerant charges and different system specifications
 - CARB Phase 2 has adopted the same A/C Leakage Standard (main provision and large A/C provision).
 - “Alternative means” for large A/C was not specified in CARB Phase 2.

Update to CA Phase 2 GHG Air Conditioning Leakage Requirements - via Manufacturers Advisory Correspondence (MAC) (cont.)

- Refrigerant leakage control demonstration method for large A/C systems (refrigerant charge > 3 kg, e.g. those in transit buses)
 - For large A/C systems, recommend manufacturers use SAE J2727 to evaluate A/C leak rate and demonstrate meeting the Leakage Standard of 1.50% per year (same as for other vehicle types under Phase 2)
 - For large A/C refrigerant types not covered by SAE J2727 (e.g. R-407C), recommend manufacturers to use SAE J2727 as a proxy method, and encourage them to submit leakage testing data if available

Contact: Dr. Tao Zhan, Air Resources Engineer
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Federal Phase 2 GHG Technical Amendments

- ❑ U.S. EPA working on Phase 2 GHG technical amendments
- ❑ Notice of Proposed Rulemaking to come out by end of this year
 - 40 CFR Part 1036 Subpart F (Test Procedures)
 - 40 CFR Part 1037 Subpart F (Test and Modeling Procedures)
 - 40 CFR Part 1065 (Engine Testing Procedures)
 - 40 CFR Part 1066 (Vehicle Testing Procedures)
- ❑ CARB will review and look to align with the federal technical amendments

Adoption Timeline: Two Possible Scenarios – Which Do Stakeholders Prefer?

- ❑ Early – Same as Low NO_x Omnibus Rulemaking (March 2020)
 - U.S. EPA Phase 2 GHG technical amendments will not be finalized before initial statement of reasons (ISOR) must be released (mid-Jan 2020)
 - Limited time to review the finalized federal technical amendments
 - May need to do 15-day changes to address changes not included in the ISOR
 - Might need to go back and amend CA Phase 2 regulation
 - Applicability: by mid-2021 MY
- ❑ Later – Winter 2020 / Spring 2021
 - U.S. EPA Phase 2 GHG technical amendments would be final
 - Reduced need to amend regulation
 - Applicability: 2022 MY
 - Not aligned with U.S. EPA for 2021 MY

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Background

- ❑ No stand-alone certification procedure currently exists for Heavy-Duty Hybrid Vehicles (HDHV) for criteria pollutants
- ❑ U.S. EPA's GHG powertrain testing for heavy-duty hybrid vehicles
 - Powertrain testing is allowed as a testing option to comply with Phase 2 GHG standards
 - Powertrain test results are used as inputs into GEM
 - NOx test results are required to be submitted
- ❑ CARB's existing hybrid testing requirements
 - CARB's interim certification procedure (CARB interim procedure) for heavy-duty hybrid vehicles – chassis dynamometer
 - Innovative Technology Regulation (ITR) – Provides procedure for testing hybrids using CARB interim procedure, Portable Emissions Measurement System (PEMS), or U.S. EPA powertrain testing
 - Incentive program (HVIP) – Requires testing of hybrid to show no increase in NOx emissions using CARB interim procedure or PEMS to receive incentive money

Proposal Rationale

- Current U.S. EPA Phase 2 GHG activities
 - Developing technical amendments to the Phase 2 GHG Rule
 - Update and expand on existing testing requirements and procedures for GHG
 - Existing provisions focused on GHG
 - Proposed technical amendments expand scope and details of powertrain testing procedures for hybrids, allow for potential NOx certification
 - Anticipated NPRM released date: November 2019
 - Anticipated Final Rule: Approx. Spring / Summer 2020
- Proposal
 - Provide an alternate certification pathway for HDHV
 - Develop criteria pollutant emission and GHG certification procedure for HDHV using powertrain dynamometer
 - Utilize U.S. EPA powertrain test procedures for GHG for hybrids, as amended
 - 40 CFR 1036, 1037, 1065, 1066, etc.

U.S. EPA Phase 2 GHG Proposed Technical Amendments Summary

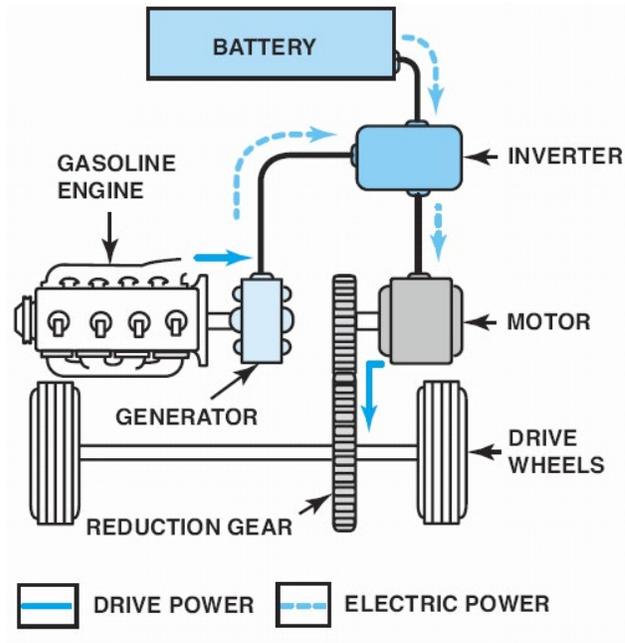
- 40 CFR 1036 Subpart F – Test procedures
 - Engine data and information for vehicle certification (section 1036.503)
 - Powertrain ramped-modal testing procedures (section 1036.505)
 - Vehicle parameters
 - Vehicle test mass, frontal area, drag, rolling resistance, axle ratio, tire radius, transmission
 - Duty cycle: schedule of vehicle speeds and road grade
 - Transient testing (section 1036.510)
 - Transient duty cycles: spark-ignition engines, compression-ignition engines
 - Follow 1037.550 for powertrain testing procedures
 - Hybrid powertrain system rated power (section 1036.527)

U.S. EPA Phase 2 GHG Proposed Technical Amendments Summary (cont'd)

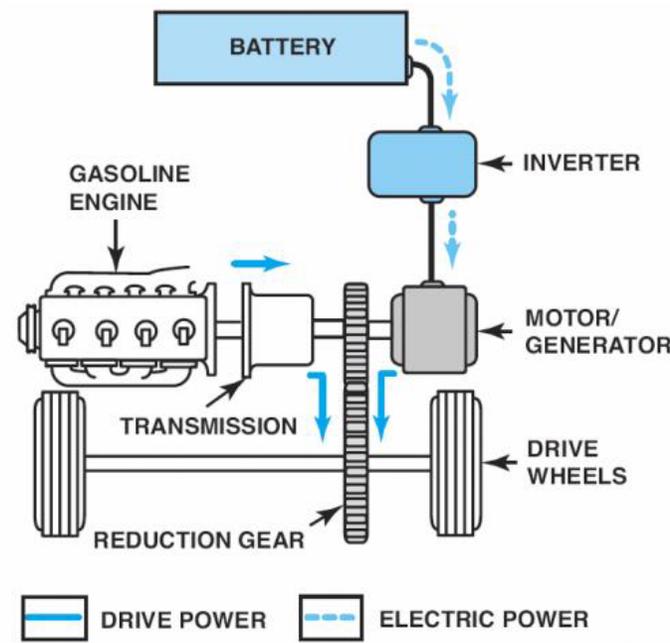
- 40 CFR 1037 Subpart F
 - 1037.550 Powertrain testing
 - Vehicle model (simulate vehicle being tested: use equations or MATLAB/Simulink code)
 - Driver model (simulate a human driver: modulate throttle / brake pedals to follow test cycles)
 - Test configurations
 - Three equally-spaced axle ratios or tire sizes and three different road loads (9 configurations); or
 - Four equally-spaced axle ratios or tire sizes and two different road loads (8 configurations)
 - Axle ratios to represent full range of expected vehicle installations
 - Optionally, axle ratios / tire sizes may be selected to cover expected minimum/maximum vehicle speed
 - Vehicle weight may be certified to intended vehicle class, e.g., MHV or HDV, etc.
 - Emission measurements: 40 CFR part 1065

Hybrid Architecture

Series



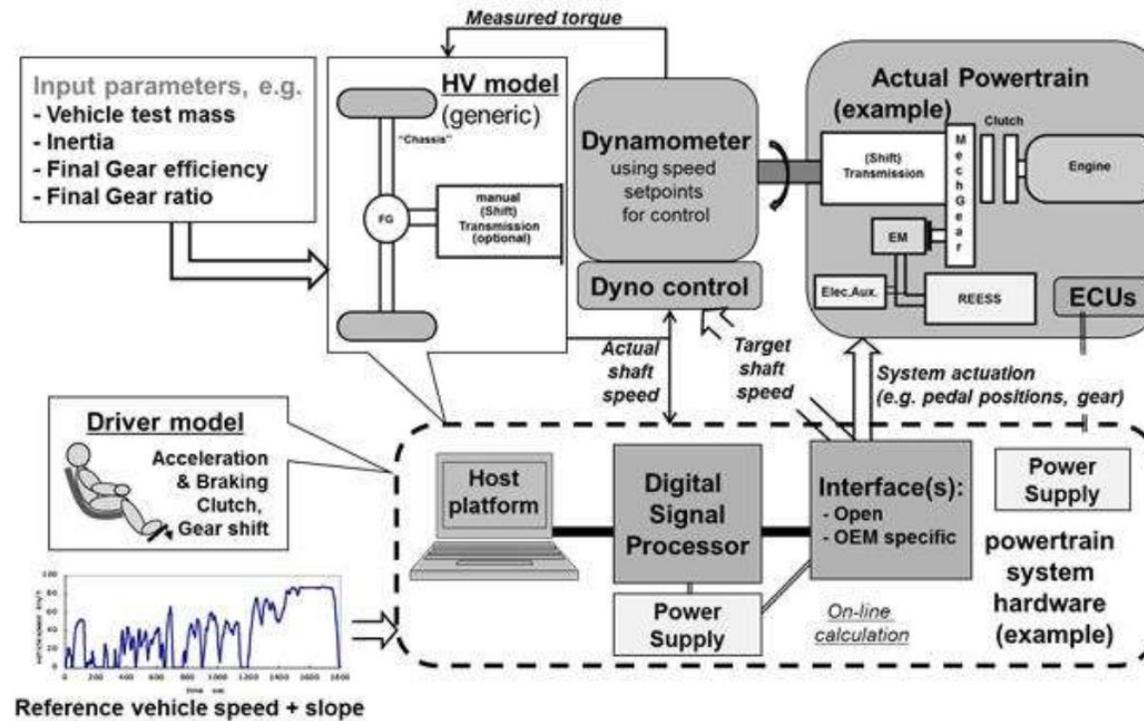
Parallel



Powertrain Testing

Powertrain-in-the-Loop

Outline of powertrain system setup



Issues

- ❑ Certification families
- ❑ Durability requirements
- ❑ Useful life, warranty and recall requirements
- ❑ OBD compliance
- ❑ Labeling
- ❑ Others:
 - System monitoring and diagnostics information
 - Diagnostic communications tools compatibility
 - Standardized battery-capacity test

Adoption Timeline: Two Possible Scenarios – Which Do Stakeholders Prefer?

- ❑ Early – Same as Low NOx Omnibus Rulemaking (March 2020)
 - Would not be able to fully address all issues
 - Limited stakeholder participation
 - U.S. EPA Phase 2 GHG technical amendments will not be finalized before initial statement of reasons must be released (mid-Jan 2020)
 - May need to do 15-day changes to address changes to U.S. EPA proposal
 - Might need to go back and amend regulation
 - Available for use earlier (MY 2021)
- ❑ Later – Winter 2020 / Spring 2021
 - Could address most / all issues
 - Increased stakeholder participation
 - U.S. EPA Phase 2 GHG technical amendments would be final
 - Reduced need to amend regulation
 - Available for use later (MY 2022)

Contact

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Any Questions, Comments?

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CA Phase 2 GHG Trailer Certification Background

- ❑ Trailer manufacturers regulated for the first time
- ❑ Adopted CA Phase 2 trailer standards equivalent to the U.S. EPA Phase 2 trailer standards as of October 25, 2016
- ❑ Implementation begins with 2020 MY specifically trailers manufactured on or after January 1, 2020

Regulated Trailer Types

- ❑ Long-box dry vans (greater than 50.0-feet in length)
- ❑ Long-box refrigerated vans (greater than 50.0-feet in length)
- ❑ Short-box dry vans (50.0-feet and shorter in length)
- ❑ Short-box refrigerated vans (50.0-feet and shorter in length)
- ❑ Tank trailers designed to transport liquids or gases
- ❑ Flatbed trailers with continuous, flat platforms
- ❑ Container chassis (all lengths)



Updates since the March 25th Workshop: CA Phase 2 GHG Trailer Certification

- Certification Application Web Form
 - Certification Application Guidance Document
- End of the Year Report

Updated Certification Application Web Form and Guidance Document

- Added new fields
 - Useful life (years)
 - CO2 Emission Rate (g/ton-mile)
 - CO2 Emission Standard (g/ton-mile)

Trailer Certification Application Additions

General Information: Useful Life

Process Code:	<input type="text" value="New submission"/>
Trailer Family Name:	<input type="text"/>
Model Year:	<input type="text"/>
Useful Life (years):	<input type="text"/>
Field Edits/Changes/Corrections(1000 characters available):	<input type="text"/>

Trailer Certification Application Additions (cont.)

Emission Determination: CO2 Emission Rate and CO2 Emission Standard

Configuration Off-Cycle Improvement Factor	<input type="text"/>	<input type="text"/>	<input type="text"/>
Off-Cycle Separate Credit Amount (g CO2/ton-mile)	<input type="text"/>	<input type="text"/>	<input type="text"/>
CO2 Emission Rate (g/ton-mile)	<input type="text"/>	<input type="text"/>	<input type="text"/>
CO2 Emission Standard (g/ton-mile)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Note: Only the worst case (Highest Projected CO2 Trailer Configuration) needs to be filled out until 2027.

Trailer Certification Application Clarifications: Trailer Configurations

- ❑ Changes in the Trailer Configuration
 - Enter three configurations: shortest, longest, and most produced

Trailer Configuration

Trailer Configuration - 1

Trailer Aerodynamic Category: Trailer Climate Control Type: Trailer Length (ft.):

For Partial-Aero or Non-Aero Trailers Only

Rear Work Performing Equipment:

Side Work Performing Equipment:

Trailer Configuration - 2

Trailer Aerodynamic Category: Trailer Climate Control Type: Trailer Length (ft.):

For Partial-Aero or Non-Aero Trailers Only

Trailer Certification Application Clarifications: Trailer Family Comments

- ❑ For improved clarity, the guidance document has been updated on what must be provided in the Trailer Family Comments section
- ❑ Discuss necessary information for the Trailer Family Comments
 - List the actual trailer lengths that will be produced to the nearest foot
 - Summarize the work-performing equipment options
 - List the axle options
 - List the weight reduction components
 - List the different tire pressure system options, and write a short description about their design/operation
 - List the standard components installed on the family (for example, if all trailers in the family have an aluminum floor, etc.)
 - Describe what you think will be the most produced configuration
 - Describe the worst case configuration that will be available for sale
 - If you plan to use transitional allowance, list the estimated number of exempted trailers you plan to produce
 - List any other information you find to be necessary

CA Phase 2 Heavy-Duty GHG Regulation Trailer Certification Application (cont.)

❑ Trailer Family Comments

Are you a secondary trailer manufacturer as defined in 1037.620?:

Trade Name of Trailers in Family:

Trailer Family Comments (4000 characters available):

Trailer Assembly Plant Name and Address:

Trailer Certification Application Clarifications: Adjustable Parameters

- ❑ Clarify the use of Adjustable Parameters
 - Provided the reference definition from 40 CFR §1037.205(p)
 - A device that can be modified and would impact CO2 emissions during operation
 - Expected to be very rare for trailers

Trailer Family Adjustable Parameters

Does this trailer family contain any adjustable parameters as described in 1037.205(p)? Yes ▾

Parameter Name:

Parameter Range Description:

End of the Year (EOY) Report

- ❑ Manufacturers must submit EOY report within 90 days after the end of the model year
 - March 31, 2021 for 2020 MY trailers
 - Total U.S.- and CA-directed production volume per trailer family
 - Vehicle identification number, vehicle configuration and subfamily for each vehicle
 - Trailers exempt under the transitional allowance flexibility
 - Manufacturer average CO2 performance by subcategory
- ❑ Keep required data from emission tests and all other information for eight years after issuance of Executive Order
- ❑ Store these records in any format and on any media
 - Records must be readily available

End of the Year Report: Draft Spreadsheet

Manufacturer Name	ABC Mfr. Co.
Model Year	2020

US-directed production volume (Projected)	100
CA-directed production volume (Projected)	100
# of Exempted Box van Trailers (Projected)	20

US-directed production volume (Actual)	80
CA-directed production volume (Actual)	80
# of Exempted Non-box Trailers (Actual)	16

End of the Year Report: Draft Spreadsheet (cont.)

						Configuration			
Manufacturer Name	Trailer Family Subcategory	Trailer Family Name	Trade Make/Model Name	Vin Number	Assembly Plant	Trailer Length (feet)	Climate Control Type (Dry/Refrigerated/N/A)	Rear WPE	Side WPE
ABC Mfr. Co.	Full-Aero Long Box Dry Van	LABC3TRLR001	Model A	XXXXXXXXXXXXXXXXX1	1001 St. Sacramento, CA 95814	53' 10"	Dry		
ABC Mfr. Co.	Full-Aero Long Box Refrigerated Van	LABC3TRLR002	Model B	XXXXXXXXXXXXXXXXX2	1002 St. Sacramento, CA 95814	51'	Refrigerated		
ABC Mfr. Co.	Partial-Aero Long Box Refrigerated Van	LABC3TRLR003	Model C	XXXXXXXXXXXXXXXXX3	1003 St. Sacramento, CA 95814	53	Refrigerated	Rear Lift Gate	
ABC Mfr. Co.	Non-Aero	LABC3TRLR004	Model D	XXXXXXXXXXXXXXXXX4	1004 St. Sacramento, CA 95814	48	Dry	Rear Lift Gate	Side Lift Gate
ABC Mfr. Co.	Non-Box	LABC3TRLR005	Model E	XXXXXXXXXXXXXXXXX5	1005 St. Sacramento, CA 95814	33' 6"	N/A		

End of the Year Report: Draft Spreadsheet (cont.)

Aerodynamics (for full-aero and partial-aero box trailers only)				Tires		Off-Cycle Technologies (leave blank if N/A)			Weight Reduction			Exempt under transitional allowance? (Yes/No)	CO2 Standard	Actual CO2 Emission Rate
Aero ECI (TGRT, TATS, TARF, TAUD)	Measured ΔCdA	BIN ΔCdA	Bin Level	Tire Pressure System (TPMS/ATIS /NONE)	Tire CRR	Improvement Factor	Separate Credit Amount	Weight Reduction	Non-Wheel Related Weight Reduction	Wheel Related Weight Reduction	Total Weight Reduction (lbs.)			
TATS	0.78	0.7	IV	TPMS (or mix)	5.0				300	200	500	No	81.3	79.06
TATS, TARF	0.55	0.4	III	TPMS (or mix)	4.5				150	300	450	No	83	81.67
TATS, TARF	0.65	0.4	III	TPMS (or mix)	5.2				200	200	400	No	83	82.94
				ATIS	4.4							No	N/A	N/A
				ATIS	4.0							No	N/A	N/A

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Background

- ❑ Interim Aero Approval: Only applicable to 2018 and 2019 model-year long dry-van and long refrigerated-van trailers (TTGHG oriented)
- ❑ Preliminary Approval: If you produce aerodynamic devices for trailers, you may ask us to provide preliminary approvals to have your devices be available for certification of trailers
- ❑ Applicability: certifying long and short 2020 and subsequent model year trailers
- ❑ Aerodynamic improvement ($\Delta C_d A$) data generated in accordance with the Phase 2 procedures defined in 40 CFR 1037.526
- ❑ Approved $\Delta C_d A$ values support both CA Phase 2 trailer certification and Tractor-Trailer Greenhouse Gas (TTGHG) Regulation

Preliminary Approval Process Overview

- ❑ Present Pre-test Plan To CARB For Review
- ❑ Obtain Approval Request Form
 - Via Email (TTGHG.Interim-AeroApproval@arb.ca.gov) or
 - CARB Website ([TTGHG Interim Aero Device Approval Program](#))
- ❑ Conduct Pre-Application Activities
 - Conduct aerodynamic testing
 - Complete Approval Request Form
 - Prepare Cover Letter and Attestation Statement
 - Prepare all the supporting documents [Test Reports, Simulation Results (digital files), Installation Instruction, Maintenance Instructions, etc.]

Preliminary Approval Process Overview (cont.)

- Submit completed approval request with your approval request package by email to (TTGHG.Interim-AeroApproval@arb.ca.gov)
 - Request Secure File Transfer Protocol (SFTP) access via email for application package bigger than 20 MB in size
 - Manufacturers will use SFTP to upload large file sizes which cannot send via email.
 - For detailed information of the process, refer to February 15, 2019 Public Workshop presentation at CARB Website ([TTGHG Interim Aero Device Approval Program](#))

Contact: Moslem Hossein-Mardi, Air Resources Engineer
(916) 440-8282 or moslem.hossein-mardi@arb.ca.gov

Preliminary Approval Aero Device Warranty

- 1) Trailer Executive Order holder responsible for emission related warranty requirements (5 years for aero components)
- 2) Preliminary approved aero device manufacturers not required to submit warranty statements with request for approvals
- 3) Any contractual warranty agreements between trailer manufacturer and suppliers do not involve CARB

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Comments and questions can be directed to:

CA Phase 2		
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