

The following comments refer to Enclosure A, Amendments to the LEV III Criteria Pollutant requirements for Light- and Medium-Duty Vehicles, the Hybrid Electric Vehicle Test Procedures, and the Heavy-Duty Otto-Cycle and Heavy-Duty Diesel Test Procedures ("Second 15-Day Notice" of 9-Jun-2015):

1. **CALIFORNIA 2015 AND SUBSEQUENT MODEL CRITERIA POLLUTANT EXHAUST EMISSION STANDARDS AND TEST PROCEDURES AND 2017 AND SUBSEQUENT MODEL GREENHOUSE GAS EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES**
  - a. **Part II, A.**
    - 100.3.1.2 (page A-10), first sentence typo "may shall" needs to be just "may"
    - 100.3.4.3 (page A-11) Typo, "...40 CFR §1065.710 **15**(b)..."
  - b. **PART III:** (Page A-17) Typo, "...VHEHICLES..."
2. **CALIFORNIA REFUELING EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL YEAR MOTOR VEHICLES**
  - a. A-8 (page A-23): This section requires E10 refueling test fuel for 2017 MY and beyond vehicles that certify on E10 test fuel for evaporative emissions. This aligns with the EPA Tier 3 requirements. Some OEMs may have optionally certified early to the CARB LEV 3 requirements. At that time, EPA Tier 3 was not officially adopted yet and the specified refueling test fuel was E0 (either Phase 2 or Tier 2). Some carryover provisions should be granted for these evaporative emission families that optionally certified to LEV 3 requirements earlier than required. One possible way to handle this is to revise Table 2 to indicate that this requirement is applicable to 2017 and subsequent new certification programs.
3. **CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2018 AND SUBSEQUENT MODEL ZERO-EMISSION VEHICLES AND HYBRID ELECTRIC VEHICLES, IN THE PASSENGER CAR, LIGHT-DUTY TRUCK AND MEDIUM-DUTY VEHICLE CLASSES**
  - a. **General Comments on Parts F & G**

General comment on "worst case" determination: In multiple locations in parts F. & G. the regulations require OEMs to determine the worst case NMOG + NOx emissions individually for each test schedule, which is burdensome (potentially dual or multiple tests required per cycle). There is a provision in G.5 (only) to minimize this testing by allowing "...a manufacturer may determine the worst case operating mode by using non-certification emission data and/or an engineering evaluation." This is an important flexibility but only applies to a very limited number of vehicles and test types, namely only for UDDS testing and only for PHEV's. Again, this worst case requirement applies to all hybrid testing (plug-in and non-plug-in vehicles) on all cycles, which is a significant test burden. To minimize this testing burden in general, the regulations should allow the same engineering analysis like G.5 for all hybrid testing. We suggest putting this same allowance in the introductory section of both F. & G. so that it could be used for all testing.

General comment on "Additional End-of-Test Criterion": This is an important and appreciated provision in the regulations which will streamline testing for both OEMs and

agencies alike. The regulation requires “...approval from the Executive Officer...” in order to use these flexibilities. The ability to use these alternative end-of-test criteria needs to be approved either early in the vehicle development / certification process, or quickly during certification testing. It is unclear how this approval process will work so as not to adversely impact the certification process. We suggest allowing a more global approval process per OEM to alleviate these concerns.

General comment on J1711 Appendix C’s CO2 correction (multiple locations): “Appendix C of SAE J1711 may not be used to correct measured values for any emissions.” This **should** be allowed for CO2 (FE). We believe this was a typographical mistake since it was in the previous 15 Day Notice and is an important provision in the use of Appendix C.

**b. Part F – ZEVs and HEVs**

1 (page A-36): Section 1, the test procedures for 2018MY and later Zero Emission Vehicles, states that “ZEVs and HEVs **must** be tested using an electric dynamometer meeting the requirements of 40 CFR Part 1066 Subpart C.” (emphasis added) However, recognizing the resources involved with changing dynamometers, the EPA Tier 3 regulations do not require testing on an electric dynamometer meeting the requirements of 40 CFR Part 1066 Subpart C (“1066-compliant dyno”) until the 2022MY. ARB incorporates the EPA Tier 3 migration (i.e., no requirement for a 1066-compliant dyno until 2022MY) in the preceding two paragraphs regarding migration. Based on discussions with ARB Staff, we understand that it is NOT ARB’s intent to require testing on a 1066-compliant dyno prior to the 2022MY. We request that ARB staff clarify this in the Final Statement of Reasons (FSOR).

3 (page A-36): Section 3 contains the zero emission vehicle range testing. However, it does not mention SAE J1634 or provide an option for multi cycle test method (MCT). Will manufacturers be required to run a full city and highway deplete test? These tests are a substantial burden on test labs with respect to both site and personnel time. The multi cycle test (MCT) method significantly reduces this burden and EPA has allowed at least one OEM to use this method. To put the burden in perspective, the MCT method can normally be completed within one shift. In contrast, a full city delete may take three full shifts or more to complete and the highway depletion has similar time requirements. This 83 percent reduction in workload (six shifts vs one shift) is very significant.

8.2.5 (page A-46): Typo, “G.10” should be F.9

10 (page A-48): For both 20 & 50°F testing, since we’re following F.6, it implies we need to determine worst case NMOG + NOx at these lower temperatures (burden). PHEVs (per G.8) have the allowance to use the same worst case “as determined” at 75°F. (Note the previous Alliance and Global Automakers comments for G.8, 20°F testing, regarding using the same language “...as determined...” like the 50°F testing, plus for 20°F testing using the same NMOG + NOx criteria for worst case in lieu of CO avoids the burden of dual worst case testing). We request that the regulations be clarified to allow the worst-case determination at 75F to be used for 20F and 50F testing for HEVs, like is being done for PHEVs to keep the test burden to a reasonable level.

**c. Part G – PHEVs**

5.2.8.3 (page A-52): The regulatory language doesn't mention resetting the SOC to lowest level after the prep for non-selectable charge increasing vehicles as shown in section I, figure 7. This seems inconsistent with 5.2.8.1 & 5.2.8.2 where after prep setting of SOC guidance is provided. This resetting the SOC for non-selectable charge increasing vehicles may be mentioned elsewhere, but don't see where?

G.5.3.18.2 (page A-55): Additional EOT Criterion Clarification "The SOC at the end of the hot-start UDDS cycle is higher than the SOC at the beginning of the cold-start UDDS cycle." Instead of using "End SOC  $\geq$  Start SOC," we plan to optionally use "(Amp-hr<sub>final</sub>)  $\geq$  (Amp-hr<sub>initial</sub>)," since Amp-hours can be read from Hioki meter. We propose this interpretation of G.5.3.18.2. (Note: We do not think this is a new request or "out of scope," since it is a clarification of the requirement, but request confirmation in the FSOR.)

G.5.4.2.17 (page A-57) Primary EOT Criterion. We believe the definition of Initial and Final Amp-hour in the text is a mistake, because it conflicts with p. A-50 paragraph 8, p. A-52 5.2.8, and p. A-73 Figure 4. Paragraph 5.4.2.17 lists the primary EOT criterion as  $\leq 1\%$  NEC from the beginning of the first cycle to the end of the second cycle. However, this ignores any additional hot-start cycles driven after the first 2 cycles and cannot possibly be satisfied for a charge-depleting test. Paragraph G.5.4.3.1 lists additional EOT criterion as SAE J1711 Section 3.9 with permission of Executive Officer. SAE J1711 Section 3.9 is the same as paragraph 5.4.2.17 but considers the NEC over the last cycle or set of cycles, not the first 2 cycles. This additional EOT criterion (not the primary criterion) is what is shown in Figure 4. We recommend changing the paragraph 5.4.2.17 definition of beginning and end SOC to match SAE J1711 Section 3.9. Since this is primary EOT criterion, it does not require permission of Executive Officer. Then the Additional EOT criteria (which need permission) can be 1) SAE J1711 3.9.1, and 2) Final SOC  $>$  Initial SOC.

G.5.4.2.1 If the engine starts operating toward the end of the cold-start UDDS cycle such that *the vehicle does not achieve full warm-up conditions prior to that may cause a less than hot engine start for the subsequent hot-start UDDS cycle*, an additional hot-start UDDS cycle may be performed following the first hot-start UDDS cycle and be included in the hot-start mass summations...." We recommend removing the "fully-warm" requirement to conduct an additional hot-start cycle. Two Hot Start cycles are essential for emission test under the stable warmed up condition, so the manufacturer should be allowed to conduct 3 cycles by choice at any time, without restriction.

5.4.5 (page A-59): "0.98" criteria is too tight. The Alliance recommended a 0.95 criteria for the ratio of AER/EAER to provide some margin for errors. Also the rounding provisions on the ratio of AER/EAER seem unwarranted.

6. (HWY, page A-60), 7. (SFTP, page A-64) and section I, figure 6 (CI w/ button, page A-75) & figure 8 (CI w/o button, page A-76): For the HWY and SFTP test cycles, the two types of vehicles (w/ & w/o CI button) are being treated differently. Figure 6 shows testing with a CI button, and is technically correct, run the preps in CS then just before the emissions test switch to CI mode. However for vehicles w/o a CI button (figure 9), both the prep and the emissions test are operated in CI mode, which allows the vehicle to charge up the battery during the prep cycle, then potentially use this battery energy during the emissions cycle. Doing so provides an unfair benefit for CO2 emissions (fuel economy) and potentially other

emissions. SAE J1711 has some algorithms which would mimic figure 6 (w/ button) for figure 8 (w/o button) by setting the initial SOC before the prep to a level to achieve minimal stored battery energy after the prep and just before the emissions cycle. We request that the regulations require that the SOC be reset to the lowest level after the prep but before the emission test or if that is not practical from a timing standpoint to provide for an approach like that used in J1711.

**Previous Alliance comments from January 2015 which remain relevant:** The following comments do not refer to changes in the current 2<sup>nd</sup> 15-Day Notice. However, they were provided in our comments on the 1<sup>st</sup> 15-Day Notice, and these comments remain relevant.

1. **Part I –**

**D:** No NMOG equation for fuels between E0 & E10, recommend following 1066.635 equation

2. **CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 2018 AND SUBSEQUENT MODEL ZERO-EMISSION VEHICLES AND HYBRID ELECTRIC VEHICLES, IN THE PASSENGER CAR, LIGHT-DUTY TRUCK AND MEDIUM-DUTY VEHICLE CLASSES**

**F.10:** For HEV (F), 20°F testing, the worst case language needs to mimic the 50°F testing language like "...as determined...". Also (repeat comment) 20°F testing, the worst case being different (CO), may require two 75°F worst case tests (burden). Suggest making worst case criteria NMOG + NOx for 20°F as well or good engineering judgement.

**G.8:** 20°F testing, the worst case language needs to mimic the 50°F testing language like "...as determined...". Also for 20°F testing, the worst case being different (CO), may require 2 - 75°F worst case tests (burden). Suggest making worst case criteria NMOG + NOx for 20°F as well or good engineering judgement.