

Mail-Out # ECCD 2023-01

To: All Interested Parties

From: On-Board Diagnostics Branch, Emissions Certification and Compliance  
Division, California Air Resources Board

Date: September 29, 2023

Subject: Guidance for On-Board Diagnostic Testing Reporting Documentation

## **Guidance for On-Board Diagnostic II and Heavy-Duty On-Board Diagnostic Production Vehicle/Engine Evaluation Testing and Manufacturer Self-Testing Reporting Documentation**

This guidance applies to manufacturers of on-road light-, medium-, and heavy-duty vehicles and engines subject to the post-certification testing requirements of the California on-board diagnostic II (OBD II) system regulation (title 13, California Code of Regulations (CCR) section 1968.2) and the California heavy-duty OBD (HD OBD) system regulations (title 13, CCR sections 1971.1 and 1971.5).

### **Background:**

Title 13, CCR sections 1968.2(j) and 1971.1(l) require manufacturers to conduct production vehicle/engine evaluation testing as part of the post-certification process for OBD II and HD OBD systems, respectively. Additionally, title 13, CCR section 1971.5(c) requires manufacturers to conduct manufacturer self-testing (MST) as part of the post-certification process for HD OBD systems. These sections also require manufacturers to submit to the California Air Resources Board (CARB) a report of the testing results, which must include pertinent information that highlight and explain any problem(s) identified from the testing.

To improve the OBD system test report review process, staff developed templates for the information required to be included in each reporting documentation. These templates are intended to ensure that manufacturers provide the required information in the reports, will help streamline staff's review of the report results, and will bring issues to the forefront to allow staff to focus on any potential OBD noncompliances discovered during the testing and ensure the potential noncompliances are expeditiously addressed.

Except for the templates used for the in-use monitoring performance data, the templates discussed in this Mail-Out are currently not required to be used by manufacturers at the time of this Mail-Out publication. Therefore, the use of these templates is voluntary - though recommended - as a tool to assist manufacturers' compliance with the OBD regulations. The templates may be required in the future if the OBD regulations are amended to require their use.

## **Test Report Templates:**

### **Verification of Standardized Requirements Reporting:**

Section 1968.2(j)(1) and 1971.1(l)(1) require the manufacturers to test production vehicles/engines to ensure they meet the standardized requirements for proper communication of required emission-related messages to a scan tool. Sections 1968.2(j)(1.5) and 1971.1(l)(1.5.1) require the report of the testing results to be one single file for each model year and to include the information listed in sections 1968.2(j)(1.5.4) and 1971.1(l)(1.5.1)(C), information on any problem(s) identified, and the manufacturer's proposed corrective action (if any) to remedy the problem(s) for all testing completed for vehicles/engines in that specific model year. Each model year file must be updated by the manufacturer either after each test completion or after multiple completed tests as long as all vehicle variants are tested and reported within their specified deadlines in accordance with the regulations. Microsoft Excel templates were developed for OBD II as CARB form ECCD/OBD-129 and for HD OBD as CARB form ECCD/OBD-127. The templates are designed to provide a standard outline and format that indicate all the necessary information described in sections 1968.2(j)(1.5.4) and 1971.1(l)(1.5.1)(C) that the manufacturer must fill in. The templates also contain separate sheets (for Failures and Warnings) for the manufacturer to provide more information on any problem(s) identified, explanation of the problem(s) identified, and the manufacturer's proposed corrective action (if any) to remedy the problem(s). Further, the templates include instructions on filling in all fields and examples to clarify the intended information being requested. Lastly, the test log file(s) that is typically generated automatically during testing (e.g., SAE J1699-3 log file) is required to be submitted to CARB separately from the model year report, as specified in sections 1968.2(j)(1.5) and 1971.1(l)(1.5.1).

### **Verification of Monitoring Requirements Reporting:**

Sections 1968.2(j)(2) and 1971.1(l)(2) require the manufacturers to test production vehicles/engines to verify the ability of the OBD systems to detect malfunctions, illuminate the malfunction indicator light (MIL), and store fault codes. These sections also require manufacturers to ensure that emissions neutral diagnostics are able to detect malfunctions and activate the appropriate emissions neutral default actions. Sections 1968.2(j)(2.4) and 1971.1(l)(2.4) require one report for each verification of monitoring test conducted that must include the information listed in sections 1968.2(j)(2.4.2) and 1971.1(l)(2.4.2), the method used to induce a malfunction in each diagnostic, the MIL illumination status, and the fault code(s) stored. CARB form ECCD/OBD-130 for OBD II and CARB form ECCD/OBD-128 for HD OBD are Microsoft Excel templates that provide a defined structure and instructions for supplying all the necessary information from sections 1968.2(j)(2.4.2) and 1971.1(l)(2.4.2). This Mail-Out does not provide any guidance or templates for how to present the information regarding the method used to induce a malfunction in each diagnostic, the MIL illumination status, and the fault code(s) stored - manufacturers can continue to use their

existing format designs for providing such information. However, all the information required in sections 1968.2(j)(2.4) and 1971.1(l)(2.4) must be in one report for each test conducted in accordance with sections 1968.2(j)(2.4.1) and 1971.1(l)(2.4.1). If the manufacturer uses the Microsoft Excel templates mentioned here, manufacturers that submit information about their methods for malfunction inducement, MIL illumination, and stored fault codes in a format other than Microsoft Excel (e.g., Portable Document Format (PDF)) can attach the completed Microsoft Excel template to their PDF document, while manufacturers that submit the information in Microsoft Excel sheets can add the sheets to the completed Microsoft Excel template as separate sheet tabs.

### **Verification and Reporting of In-Use Monitoring Performance Requirements:**

Sections 1968.2(j)(3) and 1971.1(l)(3) require manufacturers to collect and report in-use monitoring performance ratio (i.e., rate based) data from in-use vehicles. The regulation sections also require manufacturers to use the standardized format provided in Mail-Out #MSC 06-23 and Mail-Out #MSC 09-22 for reporting the in-use rate-based data (CARB forms ECCD/OBD-115 and ECCD/OBD-116 for OBD II, forms ECCD/OBD-120 and ECCD/OBD-121 for HD OBD). CARB is updating those templates to include three new information columns for manufacturers to input the OBD II group or OBD certification documentation group (if applicable), whether or not the vehicle is an alternate-fueled vehicle, and the powertrain type (i.e., conventional, mild hybrid electric, strong hybrid electric, or plug-in hybrid electric vehicle). This new information is required to be reported by manufacturers in accordance with sections 1968.2(j)(3.2) and 1971.1(l)(3.4).

Additionally, sections 1968.2(j)(3.2) and 1971.1(l)(3.4) require manufacturers to report standardized data, including the data required in sections 1968.2(g)(4) and 1971.1(h)(4) (i.e., the OBD snapshot data), the tracking requirements data in sections 1968.2(g)(5) and 1971.1(h)(5) (e.g., oxides of nitrogen emission tracking data, vehicle/engine operation data used to characterize greenhouse gas emissions, cold start emission reduction strategy tracking data), and the supplemental monitor activity data in sections 1968.2(d)(5.7) and 1971.1(d)(5.7). The regulations dictate from which vehicles the manufacturer is required to submit the data (e.g., the OBD II regulation requires the reporting of these data for all vehicles using SAE J1979-2, the HD OBD regulation requires the reporting of the OBD snapshot data for all 2022 and subsequent model year engines). CARB added sheets to the in-use rate-based data CARB forms mentioned above to accommodate the inclusion of the standardized data. CARB recommends using the updated templates for ease of use; however, the in-use rate-based data sheet for each updated template is required to be used.

All sheets in each template allow for inputting data for up to 30 vehicles. If a manufacturer needs to add data from more than 30 vehicles, then the manufacturer will need to create additional sheets for each sheet tab, with each new sheet continuing the numbering for the vehicle number (i.e., No.) from the previous sheet instead of restarting at vehicle number 1 (e.g., the duplicated sheet should start with vehicle number 31). To create an additional

sheet for each sheet tab, select all sheet tabs except for the "Instructions" sheet, right-click any selected sheet tab, select "Move or Copy...", select "(move to end)," check the "Create a copy" box, then finally click the "OK" button. The name of the duplicated sheet should keep the same name as the original but include at the end of the name a number inside parentheses starting with 2 (e.g., original sheet named "Rate-Based Data" and the duplicated sheet named "Rate-Based Data (2)"). Lastly, for HD OBD, the manufacturer should submit one form for each monitoring performance group (as defined in section 1971.1 (l)(3.2)). In order for CARB staff to more easily review the data, the manufacturer should not input data from more than one monitoring group into one form.

### **MST Reporting:**

Section 1971.5(c)(6) requires manufacturers of heavy-duty engines to procure and test in-use engines to ensure OBD systems are able to detect a fault for all emission threshold monitors before emissions exceed the malfunction criteria established section 1971.1. Section 1971.5(c)(6)(A) outlines the requirements for the manufacturer reporting of MST results to CARB. CARB form ECCD/OBD-126 is a Microsoft Excel template developed for reporting the required test engine information and summary information of any testing failures. This Mail-Out does not provide any guidance or templates for how to present the report portion of the test methods and results for each diagnostic required in sections 1971.5(c)(6)(A)(ii) through (iv) (i.e., the test sequences used for each testing, modified or deteriorated components used for fault simulation with respect to each testing, and test results of all testing done under sections 1971.5(c)(3) and (c)(4) for each test engine). Manufacturers can continue to use their existing format designs for providing such information. However, for each report submitted, all the information required in section 1971.5(c)(6)(A) must be together in one file. To achieve this, manufacturers that submit information about their test methods and results in a format other than Microsoft Excel (e.g., a PDF) can attach this completed Microsoft Excel template to their PDF document, while manufacturers that submit the information in Microsoft Excel sheets can add the sheets to the completed Microsoft Excel template as separate sheet tabs. Manufacturers can either submit separate reports for testing conducted under section 1971.5(c)(3) and additional testing conducted under section 1971.5(c)(4), or provide all the information required in section 1971.5(c)(6)(A) in a single report that is updated it after completion of each testing (i.e., the report will first be submitted to CARB after completing testing conducted under section 1971.5(c)(3), then the same report will be updated after completing testing conducted under section 1971.5(c)(4)(B)).

### **Electronic Documentation Management System:**

With the addition of these new production vehicle/engine evaluation testing and MST templates, a new guidance document was developed to describe the process for submitting the documents to CARB's electronic documentation system, including how to manage the workflows and modify the file naming convention, if needed. The guidance document can

be found in CARB's current electronic documentation system, specifically the On-Board Diagnostics vault of CARB-eFILE. Staff may periodically modify the guidance document to provide important updates to the uploading and submitting procedures for these test reports.

## Summary:

Staff developed these templates to help expedite the review of the production vehicle/engine evaluation testing and MST results. The templates can be found on the [CARB OBD Program Resources website](#). Staff may periodically modify these templates to further facilitate review of the testing results and the updated templates will be uploaded to the same CARB website. Additionally, staff will send out an email informing manufacturers of modifications made to the templates. Manufacturers interested in receiving future emails should subscribe to the On-Board Diagnostics Program topic at the [CARB topics subscription website](#). By signing up for this topic, subscribers will also receive a notice whenever changes are made to the CARB OBD Program website.

Questions regarding this guidance should be directed to Mr. Lawson Adams, at (951) 542-3053 or by email at [lawson.adams@arb.ca.gov](mailto:lawson.adams@arb.ca.gov).

Sincerely,



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