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Nissan Motor Co., Ltd

Report on conformity of production sampling test data for emissions/fuel consumption at Nissan Tochigi and Oppama Plants, Nissan Shatai Shonan and Kyushu Plants, and Auto Works Kyoto

1. Background of Detection

The “Japan Manufacturing & SCM Operation Division” was established in April this year as part of the measures to prevent the recurrence of problems relating to the vehicle final inspection. A department was set up in the division responsible for specifically carrying out duties to ensure compliance with laws, ordinances and regulations, promotion of IoT in the vehicle final inspections, and implementation of the countermeasures, and since its establishment, it has been implementing comprehensive compliance checks of the frameworks, organization and processes in place. These are part of the “compliance checks for all operations” countermeasures that Nissan is implementing, as an enhancement of the compliance checks that the Manufacturing Division has been pursuing from February this year, and in addition to countermeasures carried out after receiving the improvement orders from the Minister of Land, Infrastructure, Transport and Tourism on March 26, 2018. While pursuing such initiatives, the Japan Manufacturing & SCM Operation Division conducted a survey on the exhaust emission sampling tests based on incidents occurring in other companies, and as a result, detected the facts described in “2” below.

2. Facts Found

As a result of carefully scrutinizing the log data of a total of 2,187 vehicles stored on hard disks of the exhaust emission sampling measuring equipment or other recording media, the following incidents were found in the vehicles manufactured in all of the vehicle plants other than Nissan Motor Kyushu.

1) Deviations from the test environment

Even though the tests did not comply with the conditions of the test environment prescribed in the notice stipulating the details of the safety standards of the road transport vehicles (hereinafter referred to as “notice”) to be followed when performing the exhaust emission/fuel economy measurement tests, it was confirmed that a total of 690 vehicles were handled as though they had achieved valid measurement results.

In particular:

a) The exhaust emissions must be measured through vehicles traveling according to the speed and time conditions specified under the JC08 test cycle, but in reality, a total of 628 vehicles were handled as valid measurement results despite the fact the vehicles were traveling beyond the deviance time permitted by the notice (trace error).

b) During the measurements, the test chamber's temperature is to be kept within 25±5 degree Celsius and humidity is to be kept within the range of 30% to 75%, but in reality, there were 62 vehicles which were handled as valid measurement result despites the measurements having been carried out in an environment exceeding the permissible temperature and humidity ranges.

c) The measuring equipment should be calibrated before each measurement takes place, but a total of 35 vehicles were measured without the equipment being calibrated beforehand.

2) Rewriting of measured values
There were a total of 913 vehicles where measured values were rewritten.

In particular:
a) It was confirmed that there were a total of 808 vehicles where the exhaust emission measurement results[1] data (the values described in the measurement results report) had partially been rewritten on the operations screens of the measurement equipment.

b) It was confirmed that there were a total of 228 vehicles where the measured values of the dry-bulb temperatures and the wet-bulb temperatures, for humidity calculation inside the test chamber, had been rewritten.

The average[2] of measured values is used as the measurement result. In the log data, the average, maximum, and minimum data were stored for each measurements. For average values which were outside the range between minimum and maximum, we considered that these average values were rewritten, and checked all log data to find out "a" and "b" as listed above.

3) Subject plants, models, and period
The plants, models, test periods and log data availability periods for 1) and 2) above are as follows.

Plants	Models	Test period	Data period
Tochigi Plant	R35 (GT-R), Z34 (Fairlady Z), HV37/YV37 (Skyline), K/NY51/Y51/HY51 (Fuga)	4/5/2013 - 6/5/2018	4/3/2013 - 6/14/2018
Oppama Plant	E12/HE12/NE12 (Note), F15/NF15/YF15 (Juke), Z12 (Cube), B17 (Sylphy), K13/NK13 (March)	1/7/2017 - 6/19/2018	1/7/2017 - 6/20/2018
Nissan Shatai Shonan Plant	M20 (NV200 Vanette, NV200), VM20/VNM20 (NV200 Vanette), Y12 (Wingroad), VY12/VZNY12 (NV150 AD)	1/10/2015 - 5/22/2018	1/9/2015 - 6/20/2018
Nissan Shatai Kyushu	E52 (Elgrand), E26 (NV350 Caravan)	4/5/2017 - 6/18/2018	4/4/2017 - 6/21/2018
Auto Works Kyoto[3]	F24 (Atlas), E50P (Paramedic)	5/15/2015 - 7/12/2017	4/24/2015 - 6/9/2018

[1]Data for CO_2, THC, NOx, CH_4 and CO emissions

[2]After the concentration of exhaust emissions from vehicles during driving tests has stabilized, measurements of each gas will be carried out for at intervals of 0.1 seconds for a total of 3 seconds. The average for each gas is calculated from the 30 data points recorded in this manner.

[3]Vehicles manufactured at Auto Works Kyoto are tested at the Nissan Shatai Shonan plant. Nissan Shatai

Upon discovering these facts, we immediately took the following countermeasures to prevent data from being rewritten before being saved.

1) Suspended emissions sampling testing in all vehicle production plants and restarted emissions testing under the presence of manager or supervisor at all times, with log data to be double-checked.

2) By the end of July 2018, the measurement equipment system is to be changed so that measured data cannot be manually rewritten.

3. Results of verification by NML

1) Results of verification

I. Verification of conformity with the safety standards and catalog specifications for exhaust emissions

As a result of the verification, except for R35 (GT-R), we confirmed that all of the vehicle types conform to the safety standards and that the average of exhaust emissions for each vehicle type guarantees their catalog specification.

For R35 (GT-R), since the production volume was small, we are currently measuring all of the newly manufactured vehicles and conducting the same verification by increasing figure N (sample size).

II. Verification of catalog specifications for fuel economy

As a result of the verification, we confirmed that all of the vehicles subject to sampling tests guarantees the catalog specifications for fuel economy.

2) Purpose of verification

I. Verification of the catalog specifications for exhaust emissions

a) Exhaust emission measurements testing method

The safety standards for the exhaust emission measurements adopt the “average regulated values”. The “average regulated values” are based on the thinking that “the average value of the exhaust emissions from all of the manufactured vehicles of the type-approval satisfies the average regulated value”.

Kyushu uses the test equipment of Nissan Motor Kyushu, and Oppama Plant uses the test equipment of Tochigi plant from Jan 2018.

However, the exhaust emission measurements require considerable time to measure each vehicle[4]. Therefore, it is not realistic to conduct exhaust emission measurements on all manufactured vehicles. Based on this point, item 6(2) of the Vehicle Type Approval Guidelines stipulates to the effect that part of the final inspections may be carried out using a sampling test method that has been clearly described beforehand. When conducting exhaust emission measurements through a sampling test method, each company is required to "carry out the sampling test in such a way that test results of some of the vehicles can be considered to satisfy the test results of all of the vehicles – the average value of the exhaust emissions of all of the manufactured vehicles meets the average regulated value – by using a quality control method".

b) Concept of exhaust emissions tests by NML

In response to a) above, our company stipulates in the internal rules that exhaust emissions measurements are to be carried out using a sampling test method. Based on the same rules, the test results for some of the vehicles are able to guarantee that the average of measured values for all of the manufactured vehicles satisfy their respective catalog specifications.

The type approval is based on our catalog specifications in which the exhaust emissions values are set much lower (more stringently) than those defined in the safety standards[5]. Therefore, by confirming that we can guarantee our catalog specifications, we can also confirm conformity to the safety standards.

Due to the nature of the sampling tests, whether we can guarantee the catalog specifications for all of the manufactured vehicles can only be an estimation using this statistical methodology. Therefore, in order to secure the reliability of the "estimations", it is necessary to secure a certain number of vehicles subject to sampling tests (referred to as "figure N").

c) Purpose of verification

This verification is to check whether it could be said using only credible data, from log data remaining in the measurement equipment terminals, that the results will guarantee our catalog specifications (for the verification method, see (3) below).

II. Verification of catalog specifications for fuel economy

This verification, as with I above, is to check whether it could be said using only credible data, from log data remaining in the measurement equipment terminals, that the models subject to sampling tests will guarantee our catalog specifications for fuel economy.

[4]This can take about 2 days per vehicle.

[5]All of our vehicles are certified as low emission vehicles and in order to obtain tax incentives, we always confirm not only to meet safety standards, but also to meet our catalog specifications as well.

3) Method of verification

In this verification, the following procedure was used to verify whether we can guarantee our catalog specifications for exhaust emissions and fuel economy.

A. Exclude vehicles measured under conditions deviating from the test environment from figure N
None of the measurement data from the vehicles measured under conditions deviating from the prescribed test environment can be deemed credible. Therefore, in this verification, we excluded such vehicles from figure N.

B. Recalculation using worst measurement values
Of the log data stored in the measurement equipment terminals (see 2 above), we used the worst measurement values for exhaust emissions and fuel economy, and verified whether the vehicles subject to the sampling tests can guarantee the catalog specifications for exhaust emissions and for fuel economy.

4. Closing

With respect to facts found as described above, we are now conducting a thorough investigation into the root cause and background. For further investigation, mainly on the root cause analysis, Nissan has retained Nishimura & Asahi Law Firm (attorneys Kei Umebayashi, Kaku Hirao, et al.). We will review our countermeasures based on the outcome of such investigations, and report in due course.