

Chronology of Defect/Noncompliance Determination

As part of NHTSA PE16-016 and EA17-003 Daimler AG (DAG) and MBUSA initiated internal investigations and set up a task force to respond to NHTSA's questions and conduct technical analyses, including vehicle inspections, to identify potential defects in the subject smart fortwo vehicles.

As part of its continued internal analysis following the opening of EA17-003, DAG obtained an undamaged, US-specification model year 2008 smart fortwo exemplar vehicle in September 2017, in order to gather additional information on possible root causes for the alleged engine compartment fire incidents. The vehicle was then shipped to Germany for a teardown inspection, including engine removal.

Inspections of this vehicle by multiple technical groups commenced in October 2017. These inspections focused on potential fluid sources, various seals, and the resonator box, as well as other potentially relevant components. The inspections also showed a sagging of certain portions of the rear insulation mat in the exemplar vehicle.

In November 2017, DAG conducted wind tunnel tests to carry out a flow analysis of the engine compartment in order to determine if the temperatures of any components on the exemplar vehicle would differ from those measured during vehicle development testing. A potential influence of the sagging insulation mat was also analyzed in the process. The tests did not reveal any increased temperatures nor did they show any negative influence of the sagging insulation mat on the air flow inside the engine compartment. Despite these results, the analysis team decided to further analyze potential influences of the sagging mat.

A thorough material analysis of the insulation mat from the exemplar vehicle was conducted in December 2017, indicating that material properties in certain areas of the mat could change over time due to various factors including heat load. This could then lead to sagging and to reduced thermal resistance.

In January 2018, thermal testing was conducted on a sample of the insulation mat to identify potential consequences of the altered material characteristics.

In February 2018, the interpretation of the results of the thermal testing combined with the results of the material analysis confirmed that the material characteristics of the insulation mat on the exemplar vehicle had significantly changed over time. The mat on the exemplar vehicle had decreased stability, and a loss of stiffness. Furthermore, a frayed material surface area was observed.

With model year 2010, the complete exhaust system for ECE-vehicles was changed as part of a world-wide vehicle facelift. The changes around the engine compartment included a significant increase of the maximum allowed temperatures on the catalytic converter of ECE-vehicles, and a redesign of the rear insulation mat. As part of the harmonization and standardization of components, the change of the insulation mat was introduced for facelifted US-specification vehicles (starting with model year 2010) as well.

A field-engineering analysis was conducted in March, 2018 on pre- and post-facelift smart fortwo vehicles to analyze the behavior of the old and the new insulation mat in regards to stability and stiffness. Results of this analysis revealed that the insulation mat on pre-facelift vehicles showed

Mercedes-Benz Part 573 Submission
Loaded to Portal April 27, 2018
Chronology-Only section

sagging, whereas the insulation mat on post-facelift vehicles had kept its original shape and surface even after high mileage accumulation.

In April 2018, combined results led to the conclusion that the degradation of the insulation mat installed in model year 2008/2009 US-specification vehicles was the root cause for the described engine compartment fire incidents.

On April 20, 2018, DAG determined that a potential safety defect of the rear insulation mat within the engine compartment in US-specification model year 2008 and 2009 smart fortwo vehicles could not be ruled out.