Jeffrey A. Kodish, Fuels Team Leader
Air Enforcement Division
U.S. Environmental Protection Agency
1595 Wynkoop Street (8MSU)
Denver, CO 80202-1129
kodish.jeff@epa.gov

RE: Mercedes Benz Emission Warranty & Mercedes-Benz USA, LLC and DaimlerChrysler AG Clean Air Act Settlement

Hello Sir,

I am writing in consideration of the above subject matter to determine if a 2015 GL550 Mercedes with less than 80,000 is eligible for the Emission Extended Warranty – Exhaust Valve Assembly MC-10233778-0001.pdf issued March 10, 2023. Please see the attached and link below:

[redacted]

Thank you for your time and consideration. Have a great day!

Sincerely

RR

Technical Report

Subject

Fuel Injector Malfunction, Emissions-System Interaction, and Cylinder Bore Scoring in Mercedes-Benz M278 Engines with Silitec Cylinder Technology

Purpose and Scope

This report was prepared to support technical and legal evaluation related to a Mercedes-Benz vehicle equipped with the M278 engine and Silitec aluminum–silicon cylinder bores in which a fuel injector was replaced under warranty prior to the discovery of cylinder bore scoring. The objective is to explain, from a systems engineering and tribological perspective, how fuel injector malfunction can contribute to:

• Catalytic converter degradation addressed under emissions warranty • Exhaust valve, guide, and seat wear addressed under emissions warranty • Fuel wash and lubrication instability leading to Silitec cylinder bore scoring

This report evaluates mechanical plausibility and known engine behavior. It does not allege intent or assert vehicle-specific causation.

Background: Fuel Injector Replacement Under Warranty

Fuel injectors on direct-injection engines are replaced under warranty only when abnormal operation is confirmed, such as:

• Overfueling or leakage • Poor atomization or distorted spray pattern • Sticking or delayed closure • Electrical or control faults resulting in improper fuel delivery

Injector replacement under warranty establishes that the affected cylinder experienced abnormal fueling prior to repair.

Overview of Silitec Cylinder Bore Technology

Silitec cylinder bores utilize pre-manufactured, fully dense hypereutectic aluminum–silicon liners cast into the aluminum engine block. Final machining and honing expose primary silicon crystals that provide wear resistance.

Silitec bore durability is highly dependent on:

• Stable oil film retention • Controlled fuel delivery • Minimal fuel dilution

Loss of oil film stability leads rapidly to aluminum smearing, scuffing, and irreversible bore scoring.

Injector Malfunction and Combustion Effects

A malfunctioning injector can produce localized overfueling, late injection, or large fuel droplets. These conditions result in:

• Incomplete combustion • Increased unburned hydrocarbons • Cylinder-specific misfire or torque imbalance • Liquid fuel impingement on cylinder walls

These effects are amplified during cold start, idle, and short-trip operation.

Fuel Wash and Cylinder Wall Lubrication Loss

Excess liquid fuel at the cylinder wall strips the oil film that separates piston rings from the bore surface. This phenomenon, known as fuel wash, causes:

• Oil dilution • Boundary lubrication failure • Elevated metal-to-metal contact

Silitec aluminum–silicon bores are particularly sensitive to fuel wash. Once lubrication collapses, aluminum transfer over exposed silicon initiates rapid scoring that cannot self-heal.

Contribution to Catalytic Converter Degradation

Injector-related overfueling introduces unburned fuel into the exhaust stream, leading to:

• Thermal overload of the catalytic converter • Accelerated chemical and ash contamination • Loss of oxygen storage capacity

These effects align directly with catalyst efficiency faults (e.g., P0420/P0430) covered under Mercedes-Benz emissions warranty extensions.

Contribution to Exhaust Valve / Guide / Seat Wear

Injector malfunction can also contribute to exhaust valve system wear through several mechanisms:

• Rich combustion and afterburning increase exhaust valve temperatures • Carbon and deposit formation disrupt valve seating • Fuel impingement strips lubrication from valve stems and guides • Uneven seating increases lateral valve loads

Mercedes-Benz emissions warranty documentation cites increased lateral forces and misfire as contributors to exhaust valve guide and seat wear, consistent with injector-induced combustion abnormalities.

Feedback Effects and Progressive Damage

Injector malfunction may initiate or accelerate a self-reinforcing damage sequence:

1. Abnormal fueling causes fuel wash and initial bore wear
2. Oil consumption increases
3. Catalyst contamination and restriction worsen
4. ECU enrichment increases to stabilize combustion
5. Fuel wash and lubrication instability intensify
6. Bore scoring accelerates

Injector replacement may halt further abnormal fueling but does not reverse damage already incurred to cylinder bores, exhaust valves, or catalysts.

Relationship to Emissions Warranty Coverage

Mercedes-Benz emissions warranty extensions address downstream symptoms such as:

• Catalyst inefficiency • Exhaust valve system misfire

Cylinder bores and short blocks are not covered under these warranties. From an engineering standpoint, however, injector malfunction operates upstream of the emissions system and can plausibly contribute to both emissions component degradation and Silitec bore scoring.

Conclusion

Fuel injector malfunction in a direct-injection M278 engine represents a credible upstream contributor to catalytic converter degradation, exhaust valve guide and seat wear, and fuel wash–induced Silitec cylinder bore scoring. Replacement of the injector under warranty confirms abnormal fueling conditions but does not negate the possibility that significant mechanical damage occurred prior to repair.

This analysis supports further evaluation of injector malfunction as a contributing factor in system-level defect allegations involving M278 engines equipped with Silitec cylinder bores.

TO: Mercedes-Benz Dealer Principals, General Managers, Sales Managers, Service Managers, Parts Managers

FROM: Joe Haller, Department Manager – Warranty, Gregory Gunther - Department Manager, Vehicle Compliance and Analysis, Engineering Services

RE: Emission Extended Warranty – Exhaust Valve Assembly MY11-14 CL-Class (216), MY12-16 CLS-Class (218), MY11-16 S-Class (221, 222, 217), MY12-16 E-Class (212, 207), MY12-15 ML-Class (166), MY13-16 SL-Class (231), MY13-15 G-Class (463), MY13-16 GL-Class (166) and MY16 GLE-Class (292,166)

DATE: March 10, 2023

IMPORTANT EMISSION EXTENDED WARRANTY INFORMATION

In our continuing efforts to assure the proper performance of Mercedes-Benz products and to enhance the satisfaction of our customers, Mercedes-Benz USA, LLC ("MBUSA") is extending the warranty coverage on the exhaust valve system in certain Model Year ("MY") vehicles listed below as follows:

- MY2011: Original New Vehicle Limited Warranty of 4 years / 50,000 miles New Vehicle **to 12 years / 120,000 miles (whichever occurs first)**
- MY2012: Original New Vehicle Limited Warranty of 4 years / 50,000 miles New Vehicle **to 11 years / 120,000 miles (whichever occurs first)**
- MY2013 – MY 2016: Original New Vehicle Limited Warranty of 4 years / 50,000 miles New Vehicle **to 10 years / 120,000 miles (whichever occurs first)**

This extended warranty applies to the following condition that may necessitate the repair or replacement of components related to the exhaust valve assembly (e.g. exhaust valve, cylinderhead) related to:

- Over time, increased lateral forces may lead to wear in the valve guide and/or seat ring. This issue could potentially cause combustion misfire for cylinder 1 through 8 (right and/or left cylinder head), resulting in an activation of the check engine Malfunction Indicator Lamp ("MIL") .

Model	*Model Years*	*Sales Designation*
CL-Class	2011 – 2014	AMG CL63, CL550 4MATIC
CLS-Class	2012 – 2016	AMG CLS63, AMG CLS63 4MATIC, AMG CLS63 S 4MATIC, CLS550, CLS550 4MATIC
S-Class	2011 – 2016	AMG S63, AMG S63 4MATIC, AMG S63 4MATIC (Coupe), S550, S550 4MATIC, S550 4MATIC (Coupe)
E-Class	2012 – 2016	AMG E63, AMG E63 4MATIC, AMG E63 S 4MATIC, AMG E63 S (Station Wagon), AMG E63 S 4MATIC (Station Wagon), E550 (Cabriolet), E550 (Coupe), E550 4MATIC
ML-Class	2012 – 2015	AMG ML63, ML550 4MATIC
SL-Class	2013 – 2016	AMG SL63, SL550
G-Class	2013 – 2015	AMG G63
GL-Class	2013 – 2016	AMG GL63, GL450 4MATIC, GL550 4MATIC
GLE-Class	2016	AMG GLE63 (Coupe), AMG GLE63, AMG GLE63 S

Please be advised that all repairs being claimed under this extended warranty must have a quick test uploaded with the following fault code information and may be audited.

- P030085 – Combustion misfire has been detected
- P030x85 – Cylinder x misfire detected. (x = the affected cylinder)

All repairs found to be functioning properly or without proper documentation will be returned and the claim debited in full. Only the following damage codes and parts may be claimed for the aforementioned repairs:

Damage Codes:

- 01205 – Valve Seat Exhaust Valve
- 01206 – Valve Guide Exhaust Valve
- 01243 – Cylinder Head Left
- 05202 – Exhaust Valve
- 01241 – Cylinder Head Right
- 01223 – Valve Guide Intake Valve
- 01224 – Valve Seat Intake Valve
- 05201 – Intake Valve

Parts:

- Cylinder Heads - A157010590080 (M157), A2780107603 (M278), A2780107703 (M278), A157010600080 (M157)
- Cylinder Head Gaskets - A2780160125 (M278), A2780160325 (M157), A2780160520 (M278), A2780160720 (M157)
- Exhaust Valve - A2780500427 (M157, M278)

Please note that damage incurred from abuse, accident, vandalism or other non-warrantable causes that are not covered by the New Vehicle Limited Warranty are similarly not covered by this Extended Warranty.

IMPORTANT:

1) Always check VMI to determine if a vehicle is covered under the 12 years / 120,000 miles for MY 2011, 11 years / 120,000 miles for MY 2012 and 10 years / 120,000 miles for MY 2013 - 2016 warranty period.
2) Quick Test Documentation with fault code information must be uploaded to pXD.

Please check the VIN in NetStar/VMI before scheduling the appointment for the repair. Applicable vehicles will be visible in NetStar/VMI on March 11, 2023.

Approximately two weeks after the posting of this NCU, a letter will be sent to owners notifying them of the warranty extension. If customers have already paid to have a repair related to the conditions specified above, they may be eligible for reimbursement. Please advise the customer to follow the instructions detailed below.

Reimbursement to Customers for Valid Repairs Performed Prior to Warranty Extension

Customers who have already paid to have a repair to the exhaust valve assembly resulting in a check engine MIL activation may be eligible to receive reimbursement.

Requests for reimbursement may include expenses for Mercedes-Benz replacement parts, labor, fees and taxes. Requests for reimbursement costs that were not related to the aforementioned conditions will not be honored.

Reimbursement may be limited to the amount the repair would have cost if completed by an authorized Mercedes-Benz dealership and repairs performed by a non-Mercedes-Benz dealership might not be reimbursed.

The following documentation must be presented to the servicing or closest Mercedes-Benz dealership for reimbursement.

Original or clear copy of **all** receipts, invoices and/or repair orders that show:

- The name and address of the person who paid for the repair.
- The Vehicle Identification Number (VIN) of the vehicle that was repaired.
- What problem occurred, what repair was done, when it was done and who repaired it.
- Only Mercedes-Benz replacement parts were used for the repair.
- Fault Code (DTCs) information belonging to this Warranty Extension (if any).
- The total cost of the repair expense that is being claimed.
- Proof of payment for the repair (copy of front and back of cancelled check, or copy of credit card receipt).
- **Reimbursement will be paid by a check from an authorized Mercedes-Benz dealership.**

Should you have any questions or concerns, please do not hesitate to open a Warranty Services case online.

[redacted]
Frederick, MD [redacted]

Jack Danielson, Exec Dir
NHTSA Headquarters
1200 New Jersey Avenue SE. West Building
Washington, DC 20590

PR

RIT

[redacted]

Department of Transportatio

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Mailstop: 4 West

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