



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

ODI RESUME

OFFICE OF DEFECTS INVESTIGATION



Investigation: EA23002
Prompted By: PE22-007
Date Opened: 09/29/2023
Investigator: Joseph Teitelman **Reviewer:** Peter Kivett
Approver: Tanya Topka
Subject: Loss of Motive Power

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Ford Motor Company
Products: Model Years 2021-2022 Ford Bronco, Edge, Explorer, and F-150 and Lincoln Aviator and Nautilus vehicles
Population: 708,837 (Estimated)

Problem Description: Under normal driving conditions without warning the vehicle may experience a loss of motive power without restart due to catastrophic engine failure related to an alleged faulty valve within 2.7 L and 3.0 L EcoBoost Engines.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	EWR D&I	Other	Total	EWR Field Reports
All Incidents:	52	328	0	1,296	861*	0
Crashes/Fires:	0	0	0	0	0	0
Injury Incidents:	0	0	0	0	0	0
Number of Injuries:	0	0	0	0	0	0
Fatality Incidents:	0	0	0	0	0	0
Number of Fatalities:	0	0	0	0	0	0

Description of Other: Manufacturer Warranty Claims & Engine Exchanges

*Total eliminates duplicates received by the manufacturer

ACTION/SUMMARY INFORMATION

Action: Open Engineering Analysis (EA)

Summary:

The Office of Defects Investigation (ODI) received three letters from consumers in March 2022, requesting the investigation of an alleged defect in the valvetrain of model year (MY) 2021 Ford Bronco vehicles equipped with 2.7L EcoBoost engines. The petitioners allege that MY 2021 Ford Bronco vehicles are experiencing catastrophic engine failure resulting in loss of motive power in a variety of

driving conditions with no ability to restart. On May 27, 2022, ODI opened a Defect Petition (DP22-001) to evaluate whether to grant or deny the petitioners' request to investigate. ODI identified 26 Vehicle Owner Questionnaires (VOQs) related to the alleged defect, leading to the granting of the petition. A Preliminary Evaluation (PE22-007) was opened on July 22, 2022, to assess the scope, frequency, and potential safety-related consequences of the alleged defect.

ODI sent an Information Request (IR) letter to Ford requesting material for both the subject 2021 Ford Bronco (25,619 vehicles), as well as additional Ford model/model year vehicle populations equipped with 2.7L EcoBoost engine including the MY 2022 Bronco (33,106 vehicles), MY 2021-2022 F-150 (155,619 vehicles), MY 2021-2022 Edge (6,889 vehicles), and MY 2021-2022 Lincoln Nautilus (8,596 vehicles). In

their response to ODI's request, Ford provided evidence of 328 customer complaints (including field reports), 487 warranty claims, and 809 engine exchanges relating to these vehicle populations. The provided data is comprised of reports of engine failure resulting in several consequences, the most common of which being loss of motive power while the vehicle is in motion. Additionally, analysis of Ford's IR response revealed that the alleged defect is present across the "Nano" engine family, which includes both the 2.7L and 3.0L EcoBoost engine variants. Vehicles which offer the 3.0L EcoBoost engine as either standard or optional equipment include MY 2021-2022 Explorer and MY 2021-2022 Lincoln Aviator. These model/model year populations will be included within the scope of the engineering analysis and updated population and failure data will be evaluated.

During the investigation, multiple contributing factors were identified which can lead to the fracturing of the intake valves in the subject engines. Ford acknowledged that a fractured intake valve can result in catastrophic engine failure and a loss of motive power and noted that following a valve fracture, a vehicle typically requires a full engine replacement. Ford advised ODI that the defective valves were

manufactured out of a specific alloy known as "Silchrome Lite", which can become excessively hard and brittle if an over-temperature condition occurs during machining of the component. A design modification was implemented in October 2021, which changed the intake valve material to a different alloy known as "Silchrome 1", that is less susceptible to over-temperature during machine grinding. Ford has identified that the defective intake valves commonly fail early in a vehicle's life and has suggested that the majority of failures have already occurred.

ODI is opening an Engineering Analysis (EA) in order to 1) evaluate the scope and frequency of allegations across the expanded scope of model/model year vehicle populations equipped with the 2.7L and 3.0L EcoBoost engines, 2) coordinate with NHTSA's Vehicle Research and Testing Center (VRTC) to evaluate field return parts, 3) analyze the effect of time-in-service on the failure rates for the affected

engines, and 4) gather and review additional information to evaluate the effectiveness of Ford's manufacturing improvements regarding the alleged defect.

To review the reports cited in the attached Opening Resume ODI Report Identification Number document, go to [NHTSA.gov](https://www.nhtsa.gov).