

**Recall: 21S32**  
**2013-2017 Explorer Cross-Axis Ball Joint**

**Chronology of Defect / Noncompliance Determination**

**Provide the chronology of events leading up to the defect decision or test data for the noncompliance decision.**

During our investigation into reports of seized cross-axle ball joints on Explorers, we found that internal corrosion was the cause of the seizures. However, we did not understand the factors that were causing the corrosion condition. We shared this information with NHTSA and worked with the agency in our investigation. To aid in our understanding of this condition, Ford approved action 20S62 (20V675) in October 2020 to conduct a torque inspection of the rear suspension cross-axis ball joint (CABJ) on Explorer vehicles in North American corrosion areas that had been remedied under prior actions (19S17, 17G01, 16S18). Initial analysis had found that fractures could occur in the outboard section of the toe link, adjacent to the knuckle attachment, due to reverse bending fatigue under high stress conditions caused by a seized CABJ. The remedy for those vehicles involved replacement of the CABJ/knuckle as necessary.

November 2020 - June 2021: As stated in the Defect Information Report for 20S62, Ford continued its investigation into this subject. As of June 08, 2021 Ford, has received 48 reports of rear toe link fracture caused by a seized CABJ on 2013-2017 MY Explorer vehicles in the United States, including 16 reports alleging loss of vehicle control and/or accident, with four allegations of injury. All reports involve vehicles operated primarily in corrosion states that use significant amounts of road salt in winter months. Most of these vehicles had been remedied under prior actions and some (4) had not been remedied. To date there have been no incidents on vehicles that were not included in the prior actions.

Explorer vehicles were designed and built with two separate CABJ designs for the rear toe link attachment. To date, all incidents relating to this subject are on the CABJ design manufactured by ZF Friedrichshafen AG that was installed in vehicles produced from September 4, 2021 - September 2017. No reports have been received on Explorer vehicles built after September 2017. Those vehicles utilize a different CABJ design.

Since November 2020, Ford conducted extensive testing to evaluate the CABJ field performance, including visual and physical evaluation of parts obtained from complaint vehicles and of parts retrieved from non-complaint vehicles in multiple non-corrosion cities. Investigation included bench testing, CAE evaluations and statistical Weibull analysis of field return parts and warranty data to predict sealing life.

Field Parts Analysis

The CABJ failure mechanism is a progressive buildup of corrosion in the joint that results from years of exposure to a highly corrosive environment where road salt is used extensively during winter months. All field part samples with extensive corrosion had evidence of road salt. All CABJs from corrosion regions evaluated exhibited seal and/or boot issues which allowed corrosive elements to enter the CABJ, resulting in some level of corrosion related degradation and increased torque. No parts from non-corrosion regions exhibited seal or boot issues. While low levels of corrosion in the CABJ do not pose a failure risk, those exposed to years of operation in regions with a combination of cold winter weather with relative high humidity and substantial road salt use showed high levels of corrosion that could potentially cause the CABJ to seize.

### Corrosion vs. Non-Corrosion Areas

The difference between the samples from corrosion states compared to samples from non-corrosion states was stark. No internal corrosion was found in any field return parts from non-corrosion regions. Samples from corrosion regions had varying levels of internal corrosion. Similarly, there are no reports of CABJ seizures from non-corrosion regions. All reports of CABJ seizure are from vehicles operated primarily in corrosion regions.

### CABJ Design Differences

Similarly, the field inspections found that a new CABJ design introduced in October 2017 has been successful in protecting the joint from internal corrosion and joint deterioration. Visual evaluation and physical testing of field return parts for the CABJ design used on vehicles produced after September 2017 found no evidence of CABJ deterioration similar to that found in the earlier design. No internal corrosion was found in any of the new design parts. This change in performance is due to changes in the sealing system, corrosion resistant grease, and improved corrosion resistant components found in the new design. And there are no reports of seizures in the newer population.

Throughout this investigation, Ford and NHTSA met weekly and monthly to discuss the status of Ford's testing, test results, and conclusions.

On July 8, 2021, Ford's Field Review Committee reviewed the concern and approved a field action.

Ford is not aware of any accidents or injuries since the previous action 20S62 was launched.

Ford is providing a customer satisfaction program for vehicles not sold or registered in corrosion states.

October 27, 2021: Ford revised the number of vehicles potentially affected according to the latest registration information.