

# RECALL 195 ATTACHMENT A (AMENDED)

## CHRONOLOGY OF EVENTS LEADING UP TO DEFECT DECISION

- July 2019

HMA received a report involving a 2019 Hyundai Tucson that allegedly caught fire while driving. The customer alleged a technician believed that the fire may have come from the ABS module. Hyundai was able to inspect the vehicle and recover the ABS module for further investigation by HMC and the supplier. Initial feedback from HMC and the supplier indicated the root cause could not be determined and it was possible that the fire was started by another source within the engine compartment. HMA initiated active monitoring of incoming claims on 2019-2021 Hyundai Tucson vehicles and 100% incident part recovery.
- July 2019 – December 2019

HMA continued active monitoring of new incidents and recovery of all incident parts for analysis. During this time, four (4) incident parts were collected and sent to HMC. HMC and Mando inspected all incident parts received but an approximate failure mechanism or root cause could not be determined.
- January 2020 – July 2020

HMA enlisted a third-party test laboratory to assist with analysis and testing of incident parts for the purposes of identifying an ABS module failure mechanism and relative root cause. During this time, nine (9) incident ABS modules were sent to the laboratory. Through disassembly and examination of internal components, the test laboratory observed evidence of an electrical resistance short caused by corrosion on the ABS module ECU's printed circuit board ("PCB"). Spectrum analysis of the corrosion residue revealed traces of copper, silicon, and tin elements. The test laboratory deduced that the residue could have been created by a corrosive reaction between byproducts of the reflow solder, containing tin, and various copper and silicon-based elements on the PCB, resulting in an electrical short. Further replication testing confirmed propagation of an electrical fire caused by this short.
- May 2020 – August 2020

From May through August the test laboratory reviewed its findings with HMA's NASO. Based on the information received, HMA's NASO convened its North American Safety Decision Authority on August 28, 2020 and decided to conduct a safety recall of certain affected model year 2019-2021 vehicles in the U.S. market.
- September 2020 – November 2020

Hyundai continued its investigation into potential root causes by analyzing warranty part returns. Although unsuccessful in determining an exact root cause, HMC concluded that the risk of an electrical short resulting in a fire could be mitigated by limiting the operating current in the ABS module through a lower amperage fuse. Based on this information, Hyundai implemented a production running change in November 2020 to replace the current-limiting 40 amp fuse in the affected ABS modules with a 25-amp version.

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- December 2020

Hyundai also continued to monitor incoming warranty claims during this time. No new incidents were reported in the U.S.; however, HMC was able to confirm claims received for Tucson vehicles not included in the involved production range of Recall 195 in foreign markets outside of the U.S. After confirming that these vehicles used the same ABS module as the recalled population, HMC shared the results of their investigation with HMA NASO.

Based on the information received, HMA's NASO convened its North American Safety Decision Authority on December 22, 2020 and decided to expand Recall 195 to include all vehicles using the recalled ABS module equipped with a 40 amp fuse.

To date, Hyundai is aware of twelve (12) engine compartment fires related to this defect in the U.S. Hyundai is aware of 9 fires in model year 2019 vehicles, 2 fires in 2020 model years and a single fire in a 2021 model. There are no related fires involving model year 2016-2018 vehicles in the U.S; however, ABS module fires have been confirmed in regional markets outside the U.S. for the affected 2016-2018 Tucson population.