TOYOTA

Toyota Motor North America, Inc.

Vehicle Safety & Compliance
Liaison Office
Mail Stop: W4-2D
6565 Headquarters Drive
Plano, TX 75024

February 6, 2020

DEFECT INFORMATION REPORT

1. Vehicle Manufacturer Name:

Toyota Motor Manufacturing Canada Inc. ["TMMC"]
1055 Fountain Street North, Cambridge, Ontario, Canada N3H 5K2

Toyota Motor Manufacturing, Kentucky, Inc. ["TMMK"]
1001 Cherry Blossom Way Georgetown, KY 40324

Affiliated U.S. Sales Company:

Toyota Motor North America, Inc. ["TMNA"]
6565 Headquarters Drive, Plano, TX 75024

Manufacturer of Engine Block

Toyota Bodine Aluminum, Inc.
301 James Lawrence Rd, Jackson, TN 38301
Telephone: 731-265-5500

Country of Origin: U.S.A.

2. Identification of Involved Vehicles and Affected Components:

Based on production records, we have determined the involved vehicle population as in the table below.

Make/Car Line	Model Year	Manufacturer	Production Period
Toyota / Avalon HV	2020	TMMK	September 16, 2019 through December 13, 2019
Toyota / Camry	2020	TMMK	September 12, 2019 through January 15, 2020
Toyota / Camry HV	2020	TMMK	September 16, 2019 through December 19, 2019
Toyota / RAV4	2019-2020	TMMC	September 12, 2019 through November 20, 2019
Toyota / RAV4 HV	2019-2020	TMMC, TMMK	September 12, 2019 through December 10, 2019
Lexus / ES300h	2020	TMMK	September 16, 2019 through December 18, 2019

Applicability	Part Number	Part Name	Component Description
MY2020 Toyota Avalon HV	11410-F0013	Cylinder Block Assembly	Engine Block
MY2020 Toyota Camry / Camry HV	11410-F0013		
MY2019-2020 Toyota RAV4 / RAV4 HV	11410-F0013 11410-F0023		
MY2020 Lexus ES300h	11410-F0013		

Note: (1) Although the involved vehicles are within the above production period range, not all vehicles in this range were sold in the U.S.

(2) Other Toyota or Lexus vehicles sold in the U.S. are not equipped with an engine assembly containing an engine block produced at the specific plant during the specific production period.

3. Total Number of Vehicles Potentially Involved:

Toyota Avalon HV	:	664
Toyota Camry	:	2,609
Toyota Camry HV	:	2,864
Toyota RAV4	:	30,515
Toyota RAV4 HV	:	6,405
Lexus ES300h	:	1,134
Total	:	44,191

4. Percentage of Vehicles Estimated to Actually Contain the Defect:

Less than 0.5%. Of the involved vehicles, approximately 250 vehicles received engine blocks that were produced under the conditions described below. Whether the issue in each case will lead to engine overheating or internal mechanical engine damage that can cause a non-hybrid vehicle stall or lead to a thermal event, depends on casting porosity condition of the engine block during production and each vehicle's operating environment.

5. Description of Problem:

The subject vehicles are equipped with a 2.5L 4 Cylinder engine (A25A) and may have been produced with engine blocks containing higher porosity levels. Higher levels of porosity could create cracks in the cooling passages, resulting in coolant leaking internally and/or externally. This may lead to engine noise, engine smoke, warning lights/malfunction indicator illumination, an audible chime sounding, and/or, in some cases, engine overheating and possible internal mechanical engine damage (e.g. seizing of internal engine components). If engine overheating or internal mechanical engine damage were to occur on involved conventional gasoline vehicles, a vehicle stall while driving at higher speeds could occur without prior warning to the driver, increasing the risk of crash. For hybrid and conventional gasoline vehicles, the internal mechanical engine damage can potentially cause engine oil to leak, which, in the presence of an ignition source, can lead to an increased risk of fire.

6. Chronology of Principal Events:

September 2019 - October 2019

In early September 2019, it was observed that a water flow meter that regulates die cooling failed and caused the die temperature to increase during engine block production. The flow meter was

replaced, and some suspect blocks were contained at the engine block plant. Engine assembly plants receiving the suspect blocks produced engine assemblies with the suspect blocks and identified no abnormalities. The produced engine assemblies and the contained engine blocks were then released for shipment.

In late September, Toyota identified a vehicle with an external coolant leak at a vehicle plant. The vehicle was inspected and the leak was observed to be coming from the engine block. The vehicle was contained and the engine was recovered for further investigation by the engine block plant.

In mid October, Toyota conducted an inspection of a vehicle at a dealer after the dealer identified, during a pre-delivery inspection, that coolant leaked into the crankcase and contaminated the engine oil. Based on the initial observation by the service technician, there was no sign of coolant present in the cooling system. Further, the technician reported that, after adding coolant and pressurizing the system, coolant leaked into the engine oil pan. The engine was recovered and sent for continued investigation to the engine block plant. The engine was determined to be from the same production period as the flow meter failure.

Through October, Toyota conducted testing on engines, identified at Toyota manufacturing facilities to have engine blocks from the suspect production period, to further investigate coolant leaks. Cut checks were done to understand the leak origin, and signs of porosity were observed in the engine blocks. Internal cracks were also observed in the cooling passages and oil return passages. Toyota hypothesized that these could be caused by abnormal cooling during the casting process.

As a water flow meter malfunction could impact cooling during the casting process, Toyota conducted a duplication trial to understand the effect on the casting process when a water flow meter fails as it did in early September at the engine block plant. During the trial, Toyota observed that an increased die temperature could occur due to lack of cooling in the casting process which could create cracks in the cooling passage(s) and lead to a coolant leak. As a result of this investigation, Toyota began a quality confirmation activity to contain potentially affected engine blocks and assemblies within Toyota's control and requested contained parts be recovered for further investigation. Toyota then began further analysis to identify the potential effect of these manufacturing conditions on assembled engines.

November 2019 - Mid Jan 2020

Toyota conducted four durability tests using engines that were assembled with engine blocks from the suspect production period. The test conditions included running the engine at a higher speed (higher RPM) over a long period of time to model a severe driving condition. The results of three of the durability tests were that one engine had an internal leak, one engine had an external leak, and one engine had no leaks. One of the four durability tests that was conducted had a mechanical failure during the testing, suggesting the possibility of engine stall. A further inspection of this engine found that a connecting rod had broken and created a hole in the engine. While the durability testing produced a mechanical engine failure involving an engine assembly produced with a suspect engine block, it was unclear if this outcome could potentially occur in the field.

Toyota initiated a failure mode analysis of the potential consequences of different levels of coolant leaks resulting from different levels of potential engine block porosity. In addition, Toyota began a part recovery activity to attempt to understand the varying levels of porosity of the engine block that may exist in the field. While its analysis continued, Toyota determined that it could not rule out the possibility that engines assemblies in the field (containing the suspect engine blocks) could experience the aforementioned mechanical engine failure, potentially resulting in a vehicle stall while driving at higher speeds or an oil could leak that could increase the risk of fire.

January 29, 2020

Based on the results of the above investigation, Toyota decided to conduct a voluntary safety recall campaign for the vehicles identified above.

Based on a diligent review of records, Toyota's best engineering judgement is that there are 7 Toyota Field Technical Reports and 4 warranty claims that have been received from U.S. sources that relate or may relate to this condition and which were considered in the decision to submit this report. In some cases, multiple reports were completed for one potential incident.

7. Description of Corrective Repair Action:

For all involved vehicles, Toyota and Lexus dealers will inspect the engine block casting serial number to determine if it is involved. In the cases where an involved engine block is identified, dealers will replace the engine including the engine block with a new one at no cost to customers.

Reimbursement Plan for pre-notification remedies

As the owner notification letters will be mailed out well within the active period of the Toyota New Vehicle Limited Warranty ("Warranty"), all involved vehicle owners for this recall would have been provided a repair at no cost under Toyota's Warranty.

8. Recall Schedule:

Notifications to owners of the affected vehicles will occur by early April, 2020. A copy of the draft owner notification will be submitted as soon as it is available.

9. Distributor/Dealer Notification Schedule:

Notifications to distributors/dealers were sent on February 6, 2020. Copies of dealer communications will be submitted as they are issued.

10. Manufacturer's Campaign Number:

	Interim	Final
Toyota:	20TB04	20TA04
Lexus:	20LB02	20LA02