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Your Ref: SJE 1221C
Our Ref : CI/TP20008802/D

21 August 2020

Asia Carz Auto
Block 24 Sin Ming Lane #02-95
Midview City
Singapore 573970

INSPECTION REPORT OF THE TOYOTA ENGINE THAT WAS FITTED ON A TOYOTA ESTIMA AERAS 2.4A MOTOR CAR WITH REGISTRATION NUMBER SJE 1221C

1. I refer to your request on 15 August 2020 to conduct a physical inspection of a Toyota engine.

2. The purpose of this inspection was to primarily determine whether the Toyota engine that was fitted on a Toyota Estima Aeras 2.4A motor car with registration number SJE 1221C is a Toyota 2AZ model engine.

3. Following the request, I had carried out a physical inspection of the Toyota engine on 20 August 2020 at the premises of 176 Sin Ming Drive #02-17, Sin Ming Autocare, Singapore 575721.

4. Measurements of the bore and stroke of the Toyota engine were obtained and thereafter compared with the bore and stroke measurements as stated in the technical specifications of a Toyota 2AZ model engine, which is the standard base model engine for a Toyota Estima.

5. I now set out my observations and comments pertaining to this inspection.

Inspection of the Toyota Engine

6. Firstly, I had noted that the Toyota engine was a used engine that was fitted on the motor car SJE 1221C, a Toyota Estima Aeras 2.4A. The engine that I had inspected was observed to be a complete assembly with all mechanical parts still intact within the engine housing. The engine number engraved on the housing was 2AZB022736. This engine number was different from the LTA log card of the motor car SJE 1221C, where the engine number indicated was 2AZF132068.

7. The chassis number engraved on the driver's side floorboard was ACR50-7057071. This corresponds to the chassis number indicated in the LTA log card of the motor car SJE 1221C. See photo 1 & 2 below.

Photo 1 shows the engine number of the Toyota engine that was fitted on the Toyota Estima Aeras 2.4A motor car with registration number SJE 1221C. The engine number engraved on the engine housing was 2AZB022736. This engine number was different from the LTA log card of the motor car SJE 1221C, where the engine number indicated was 2AZF132068.

Photo 2 shows the chassis number of the Toyota Estima Aeras 2.4A with registration number SJE 1221C. The chassis number engraved on the driver's side floorboard was ACR50-7057071. This corresponds to the chassis number indicated in the LTA log card of the motor car SJE 1221C.

8. My visual examination of the engine housing revealed the housing to be of serviceable/satisfactory condition. There was no crack and/or hole observed on the engine housing.

9. Upon my request, the Toyota engine was dismantled, specifically the top block was separated from the bottom block. This was to enable me to carry out measurements of its cylinders, in particular the bore and stroke measurements of each cylinder, which typically can be used to determine the engine displacement or more commonly referred to as engine cc or engine size. See photo 3 – 7 below.

Photo 3 shows a general view of the Toyota Estima Aeras 2.4A with registration number SJE 1221C. The Toyota engine with engine number 2AZB022736 that I had inspected was fitted on this motor car.

Photo 4 shows a general view of the Toyota engine that I had inspected. The Toyota engine was observed to be a used engine and complete assembly with all mechanical parts still intact, within the engine housing.

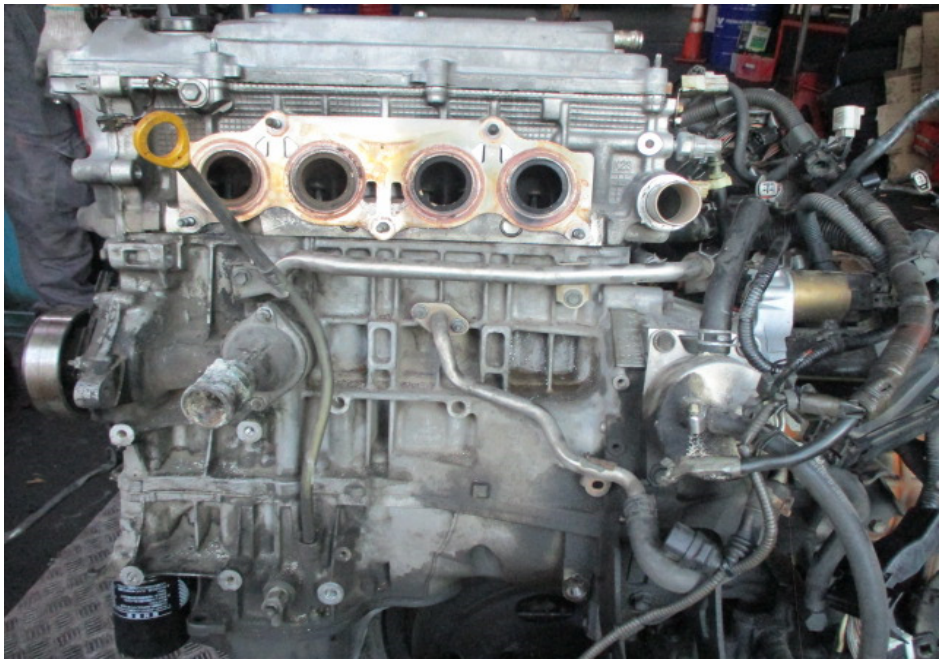


Photo 5 shows a closer view of the Toyota engine that I had inspected. My visual examination of the engine housing revealed the housing to be of serviceable/satisfactory condition. There was no crack and/or hole observed on the engine housing.

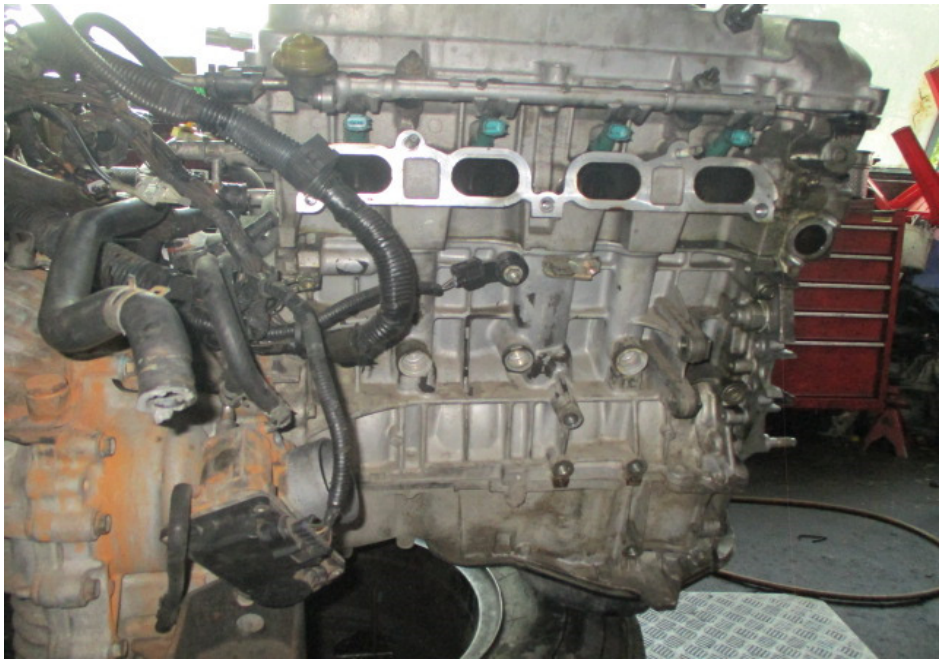


Photo 6 shows a closer view of the Toyota engine that I had inspected. My visual examination of the engine housing revealed the housing to be of serviceable/satisfactory condition. There was no crack and/or hole observed on the engine housing.

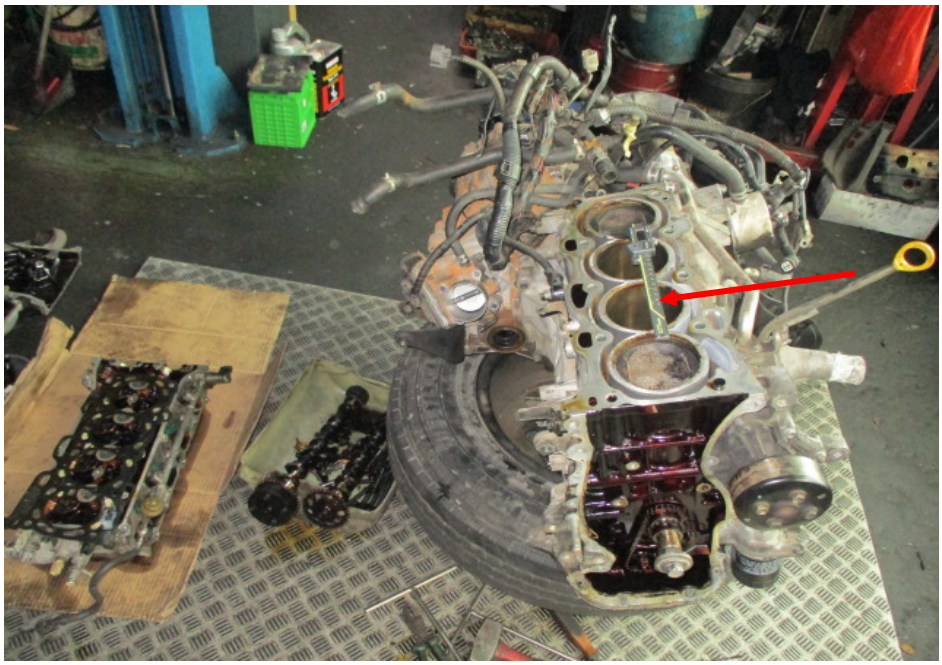
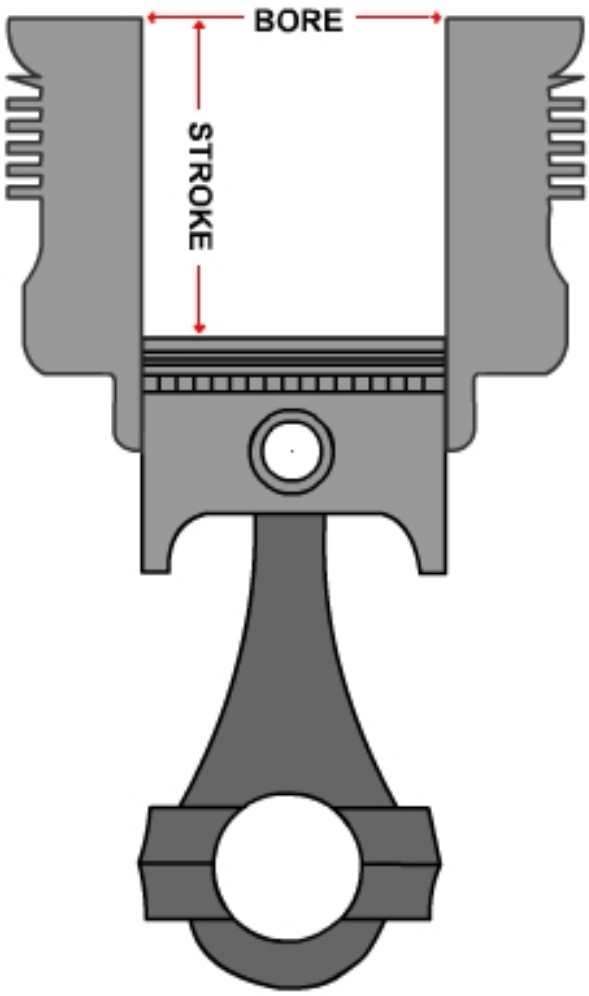


Photo 7 shows the bottom block of the Toyota engine separated from its top block. This was to enable me to carry out measurements of its cylinders, in particular the bore and stroke measurements of each cylinder, which typically can be used to determine the engine displacement or more commonly referred to as engine cc. A digital Vernier Caliper (arrowed) was used for the measurements. The digital Vernier Caliper was calibrated before the start of the measurements.

10. The bore refers to the measurement of the inside diameter of the cylinder while the stroke refers to the distance the piston moves in one direction of upward or downward movement in the cylinder. See diagram below for illustration purposes.



11. The bore and stroke measurements of the 4 cylinders of the Toyota engine are set out in the table below. Photo 8 – 22 thereafter shows the photographs taken during the measurements.

	Bore (mm)	Stroke (mm)
Cylinder 1	88.42	95.25
Cylinder 2	88.47	95.57
Cylinder 3	88.47	95.44
Cylinder 4	88.48	95.75

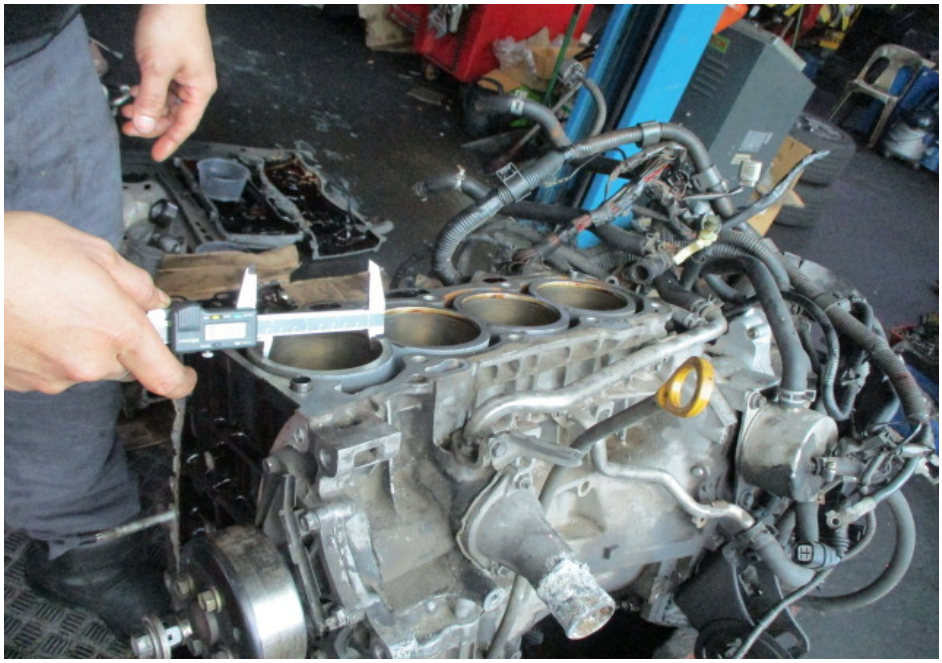


Photo 8 shows measurement being carried out to the bore of cylinder 1 of the Toyota engine. The measurements were carried out using a digital Vernier Caliper that was calibrated before the start of the measurements.

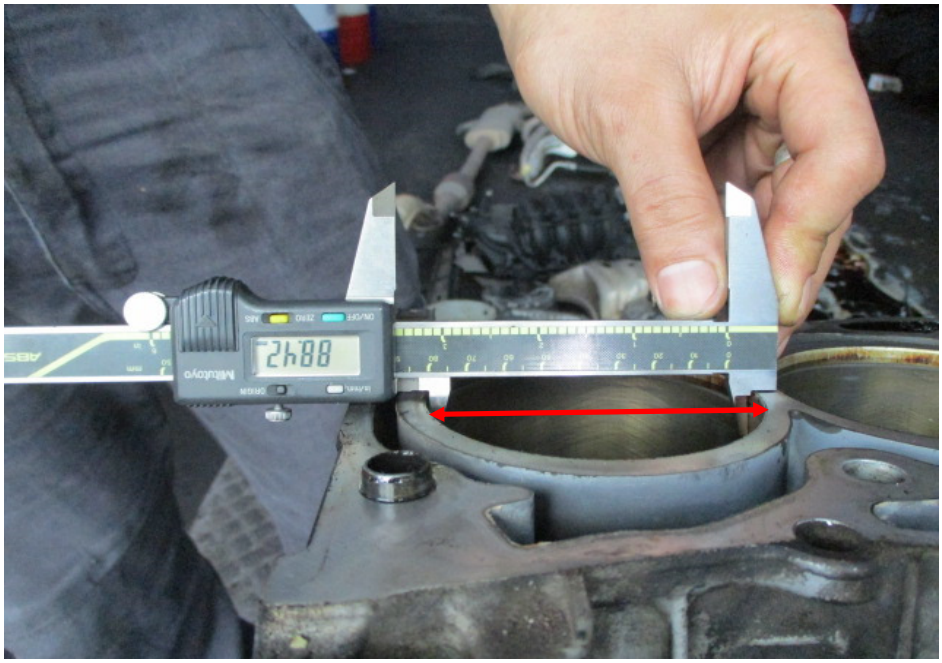


Photo 9 shows the bore (arrowed) measurement of cylinder 1, which was recorded to be 88.42mm.

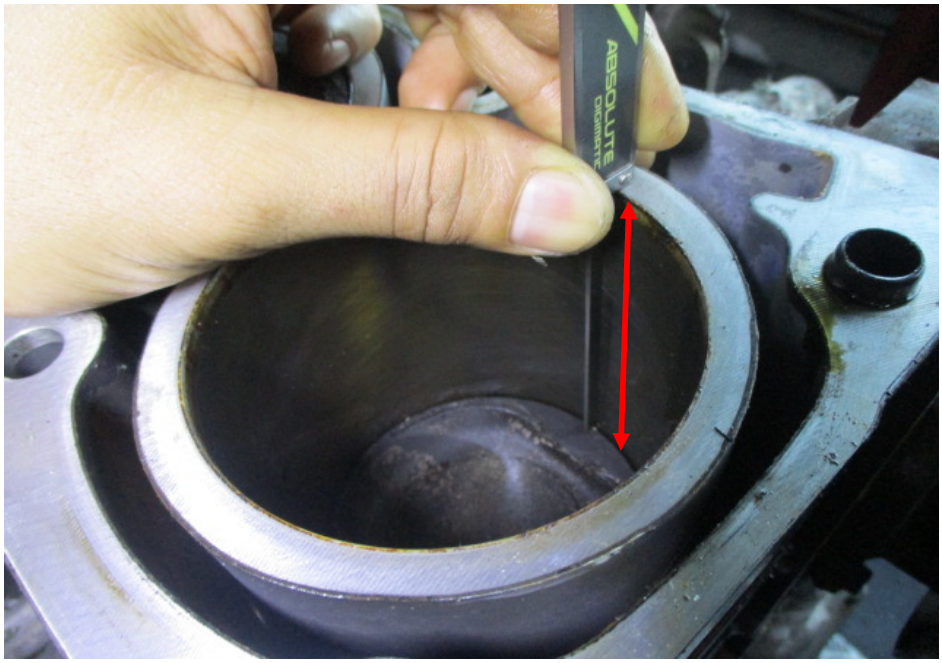


Photo 10 shows measurement being carried out to the stroke (arrowed) of cylinder 1 of the Toyota engine. The bore and stroke measurements of the Toyota engine were carried out using a digital Vernier Caliper that was calibrated before the start of the measurements.

Photo 11 shows the stroke measurement of cylinder 1, which was recorded to be 95.25mm.

Photo 12 shows measurement being carried out to the bore (arrowed) of cylinder 2 of the Toyota engine. The bore measurement of cylinder 2 was recorded to be 88.47mm.

Photo 13 shows measurement of the stroke for cylinder 2 of the Toyota engine that I had inspected. The bore and stroke measurements of the Toyota engine were carried out using a digital Vernier Caliper that was calibrated before the start of the measurements.

Photo 14 shows the stroke measurement of cylinder 2, which was recorded to be 95.57mm.

Photo 15 shows measurement being carried out to the bore (arrowed) of cylinder 3 of the Toyota engine. The bore and stroke measurements of the Toyota engine were carried out using a digital Vernier Caliper that was calibrated before the start of measurements. The bore measurement of cylinder 3 was recorded to be 88.47mm.

Photo 16 shows the bore (arrowed) measurement of cylinder 3, which was recorded to be 88.47mm.

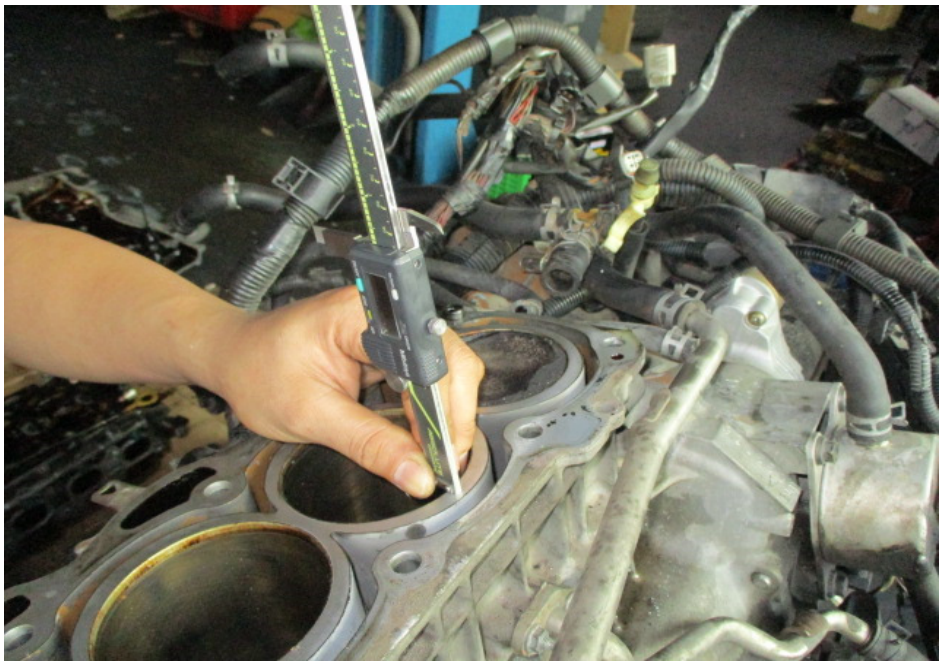


Photo 17 shows measurement of the stroke for cylinder 3 of the Toyota engine that I had inspected. The bore and stroke measurements of the Toyota engine were carried out using a digital Vernier Caliper that was calibrated before the start of measurements.

Photo 18 shows measurement being carried out to the stroke (arrowed) of cylinder 3 of the Toyota engine. The bore and stroke measurements of the Toyota engine were carried out using a digital Vernier Caliper that was calibrated before the start of the measurements.

Photo 19 shows the stroke measurement of cylinder 3, which was recorded to be 95.44mm.

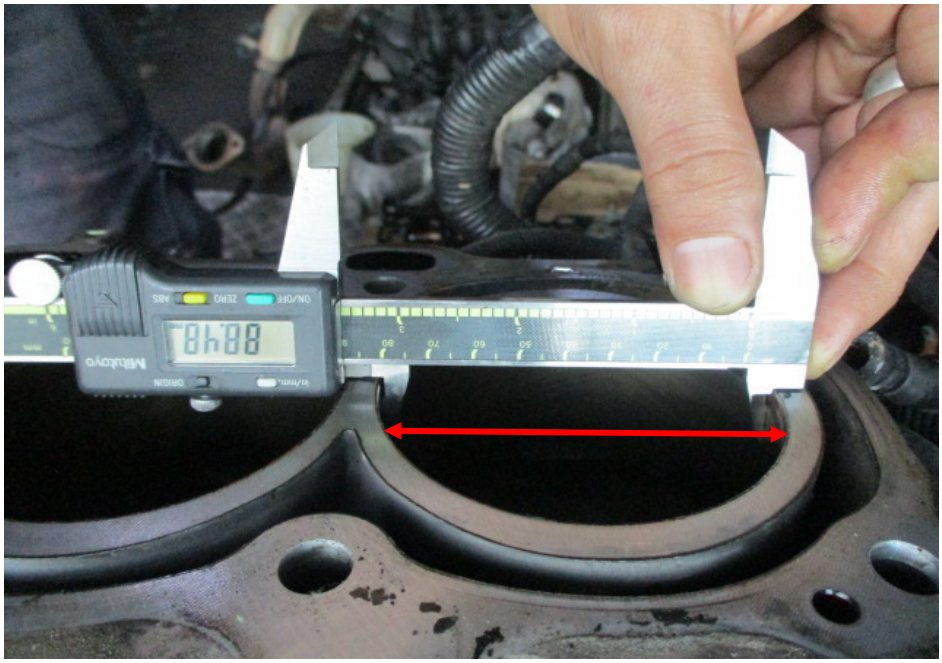


Photo 20 shows measurement being carried out to the bore (arrowed) of cylinder 4 of the Toyota engine. The bore measurement of cylinder 4 was recorded to be 88.48mm.

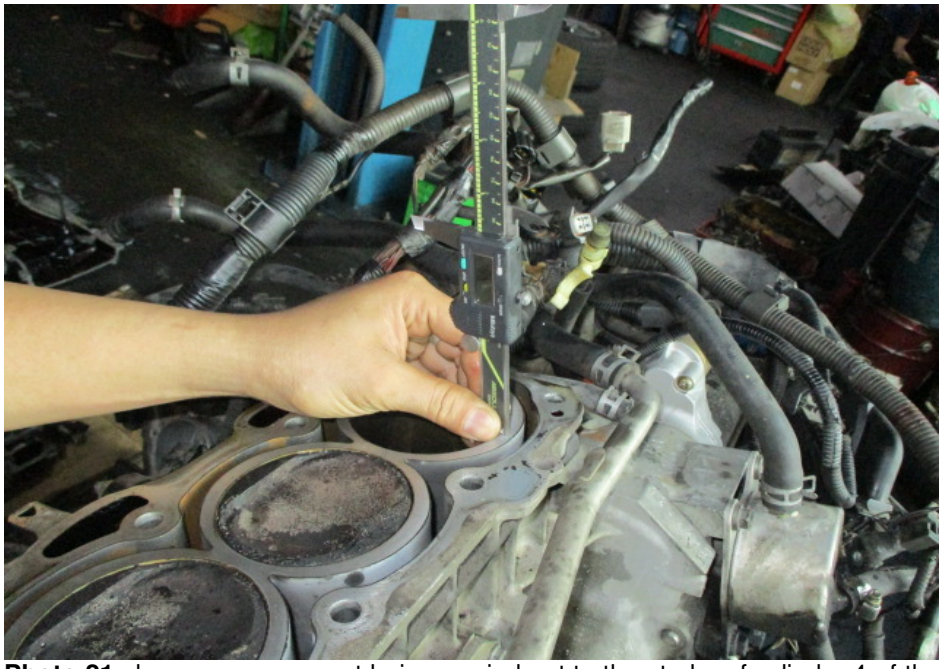


Photo 21 shows measurement being carried out to the stroke of cylinder 4 of the Toyota engine. The bore and stroke measurements of the Toyota engine were carried out using a digital Vernier Caliper that was calibrated prior to the start of measurements.

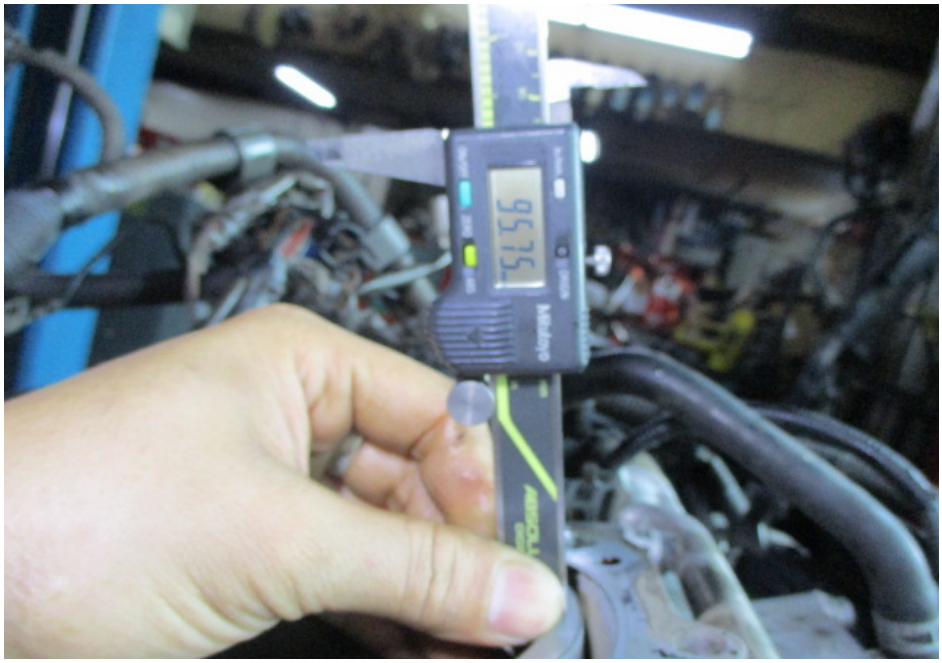


Photo 22 shows the stroke measurement of cylinder 4, which was recorded to be 95.75mm.

Toyota 2AZ Engine Technical Specifications

12. In order to determine whether the Toyota engine that I had inspected was a Toyota 2AZ model engine, I had compared the measurements of the bore and stroke of the Toyota engine with the bore and stroke measurements of the Toyota 2AZ model engine, as stated in its technical specifications. According to the technical specification of the Toyota 2AZ model engine, the bore and stroke measurement was 88.50mm and 96.00mm respectively.

13. Upon comparison, I note that the bore and stroke measurements of the Toyota engine that I had inspected (shown in paragraph 11 above) had corresponded to the bore and stroke measurements as stated in the technical specifications of a Toyota 2AZ model engine. The measurements recorded from the Toyota engine were all slightly lesser (at maximum 0.75mm lesser). This difference can be attributed to carbon accumulation within the cylinders, as the Toyota engine that I had inspected was a used engine. See technical specifications of a Toyota 2AZ model engine below.

TOYOTA 2AZ-FE ENGINE SPECS

Manufacturer	Toyota Motor Manufacturing Kentucky, Inc. Kamigo Plant Shimoyama Plant
Also called	Toyota 2AZ
Production	2000-present
Cylinder block alloy	Aluminum
Configuration	Straight-4
Valvetrain	DOHC 4 valves per cylinder
Piston stroke, mm (inch)	96 (3.78)
Cylinder bore, mm (inch)	88.5 (3.48)
Compression ratio	9.6 9.8 11 12.5
Displacement	2362 cc (144.1 cu in)

Conclusion

14. In summary, the Toyota engine that was fitted on the Toyota Estima Aeras 2.4A motor car with registration number SJE 1221C is a Toyota 2AZ model engine, which is a standard base engine model for a Toyota Estima motor car. The engine number engraved on the housing is 2AZB022736. The engine displacement of the Toyota engine that I had inspected is 2362cc as per the technical specification.

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