

Your Ref: BMW Engine  
(number 2049C345N20B20C)  
Our Ref : CI/TP21005593/D

10 May 2021

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**INSPECTION REPORT OF A BMW ENGINE WITH NUMBER  
2049C345N20B20C**

1. I refer to your request on 03 May 2021 to conduct a physical inspection of a BMW engine.
2. The purpose of this inspection was to primarily determine whether the BMW engine is a BMW N20B model engine.
3. Following the request, I had carried out a physical inspection of the BMW engine on 05 May 2021 at the premises of No. 48 Toh Guan Road East #03-132 Enterprise Hub, Singapore 608586.
4. Measurements of the bore and stroke of the BMW engine were obtained and thereafter compared with the bore and stroke measurements as stated in the technical specifications of a BMW N20B model engine.
5. I now set out below my observations and comments regarding this inspection.

**Inspection of the BMW Engine**

6. Firstly, I had noted that the BMW engine was a used engine and not fitted on any motor car at the time of my inspection. It 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 2049C345N20B20C.
7. 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.
8. Upon my request, the BMW 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 1 – 4 below.



**Photo 1** shows a general view of the BMW engine that I had inspected. The BMW engine was observed to be a used engine and was not fitted on any motor car. It was also observed to be a complete assembly with all mechanical parts still intact, within the engine housing.



**Photo 2** shows a general view of the BMW 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.



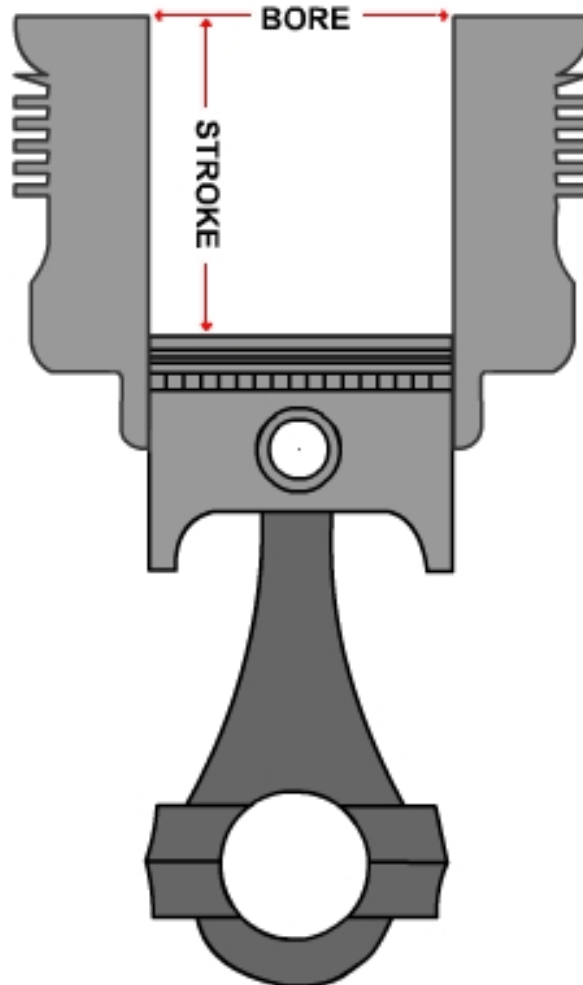
**Photo 3** shows a general view of the BMW engine that I had inspected. My visual examination of the engine housing revealed the housing to be of serviceable/satisfactory condition. There was no crack and/or hole observed on the engine housing.



**Photo 4** shows the engine number engraved on the housing of the BMW engine that I had inspected. The engine number was 2049C345N20B20C.

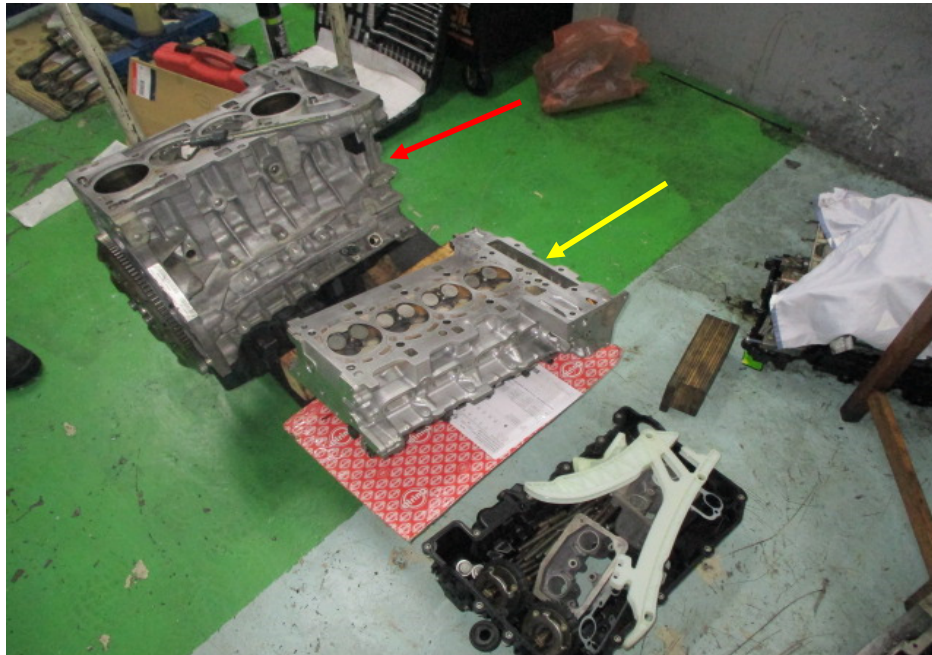


9. The bore refers to the measurement of the inside diameter of the cylinder while the stroke refers to the distance the piston moves in one direction of upward or downward movement in the cylinder. See diagram below for illustration purposes.

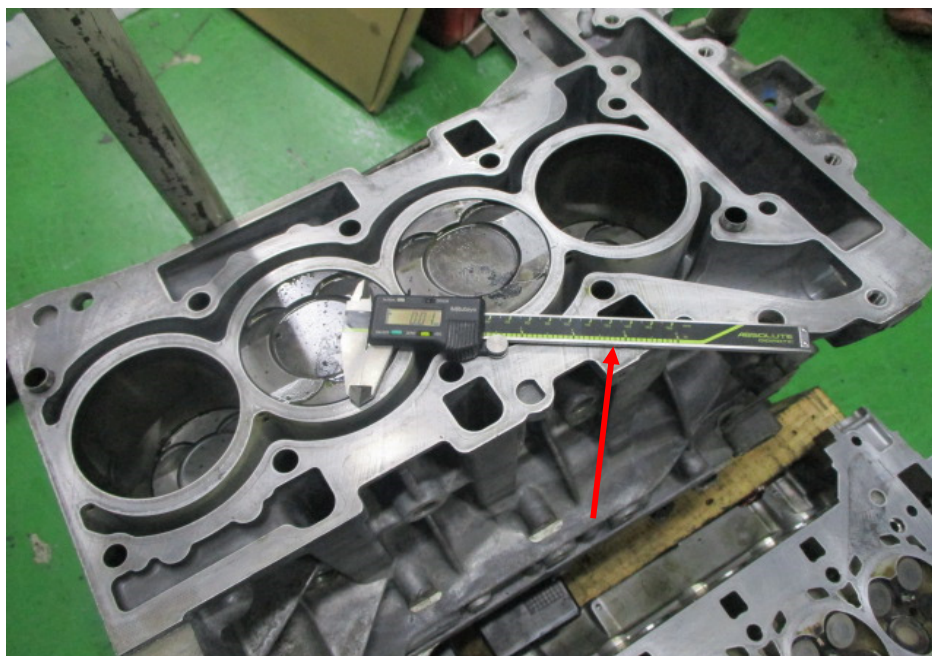


10. The bore and stroke measurements of the 4 cylinders of the BMW engine are set out in the table below. Photo 5 – 22 thereafter shows the photographs taken during the measurements.

	<b>Bore (mm)</b>	<b>Stroke (mm)</b>
<b>Cylinder 1</b>	83.97	90.09
<b>Cylinder 2</b>	83.99	89.90
<b>Cylinder 3</b>	84.00	89.87
<b>Cylinder 4</b>	83.93	90.07



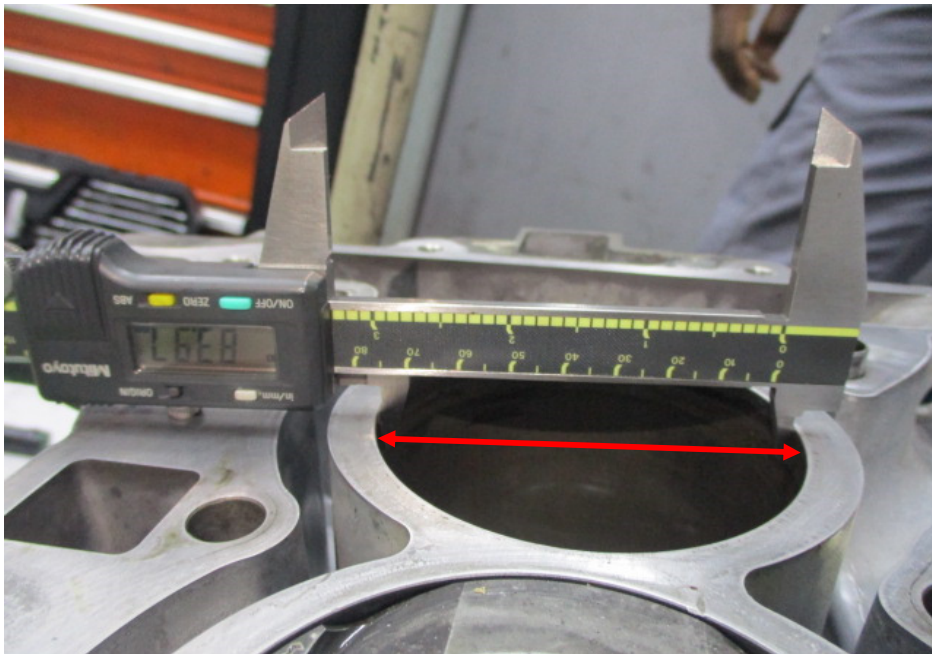
**Photo 5** shows the top block (yellow arrow) of the BMW engine separated from its bottom block (red arrow). This was to enable me to carry out measurements of its cylinders, in particular the bore and stroke measurements of each cylinder, which typically can be used to determine the engine displacement or more commonly referred to as engine cc.



**Photo 6** shows the bottom block of the BMW engine and the digital Vernier Caliper (arrowed) that was used to measure 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. The digital Vernier Caliper was calibrated before the start of the measurements.

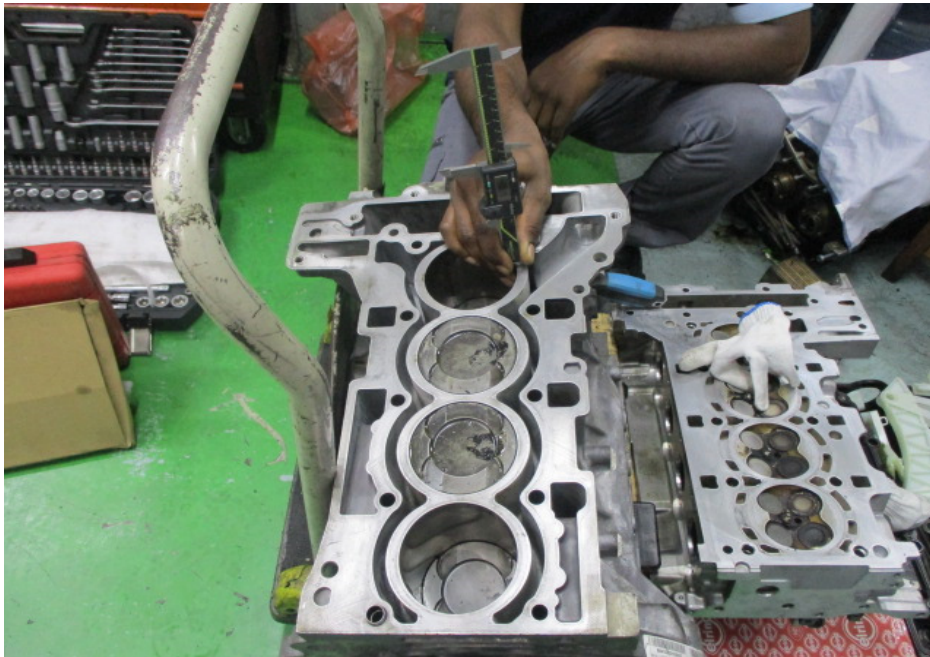


**Photo 7** shows measurement being carried out to the bore (arrowed) of cylinder 1 of the BMW engine. The measurements were carried out using a digital Vernier Caliper that was calibrated before the start of the measurements.

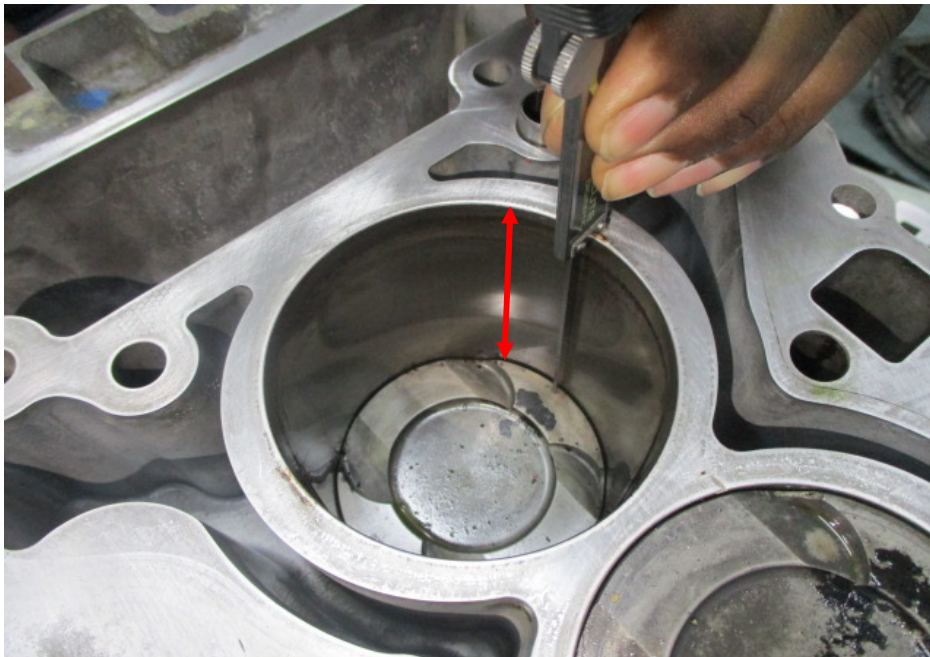


**Photo 8** shows the bore (arrowed) measurement of cylinder 1, which was recorded to be 83.97mm.





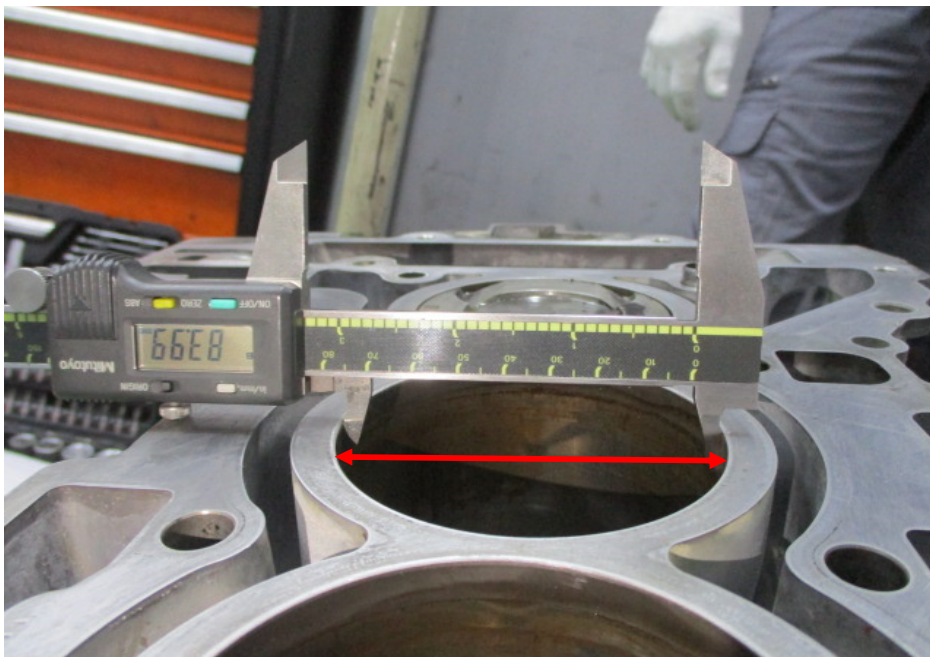
**Photo 9** shows measurement being carried out to the stroke of cylinder 1 of the BMW engine. The bore and stroke measurements of the BMW engine were carried out using a digital Vernier Caliper.



**Photo 10** shows measurement being carried out to the stroke (arrowed) of cylinder 1 of the BMW engine. The bore and stroke measurements of the BMW 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 90.09mm.

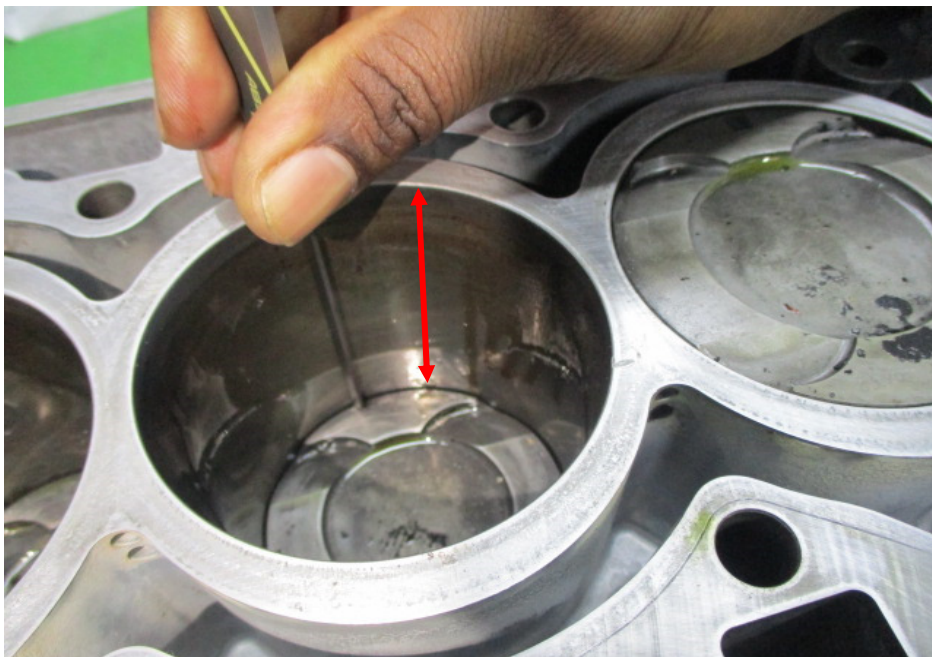


**Photo 12** shows measurement being carried out to the bore (arrowed) of cylinder 2 of the BMW engine. The bore measurement of cylinder 2 was recorded to be 83.99mm.

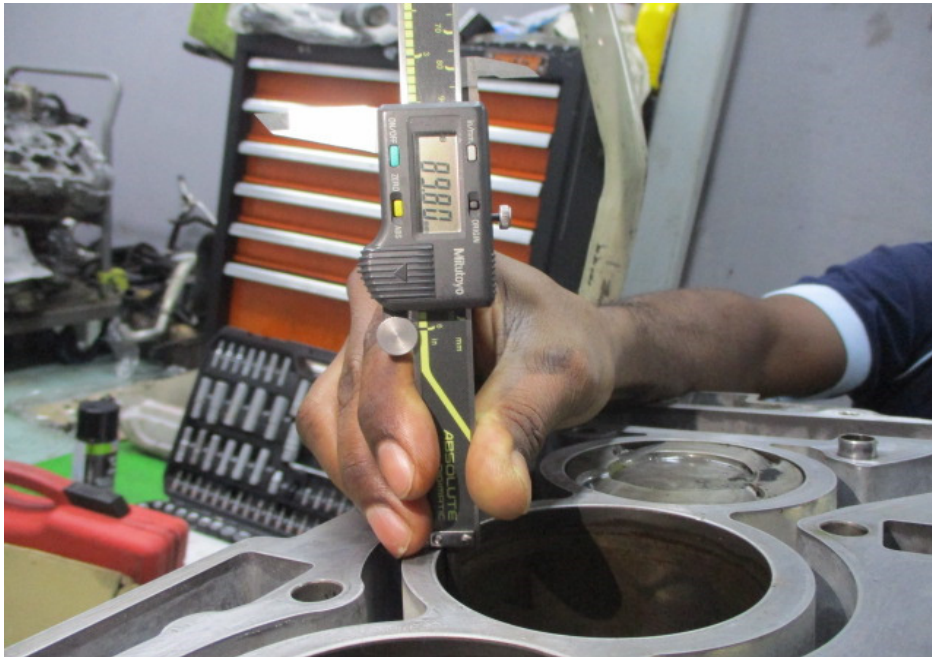




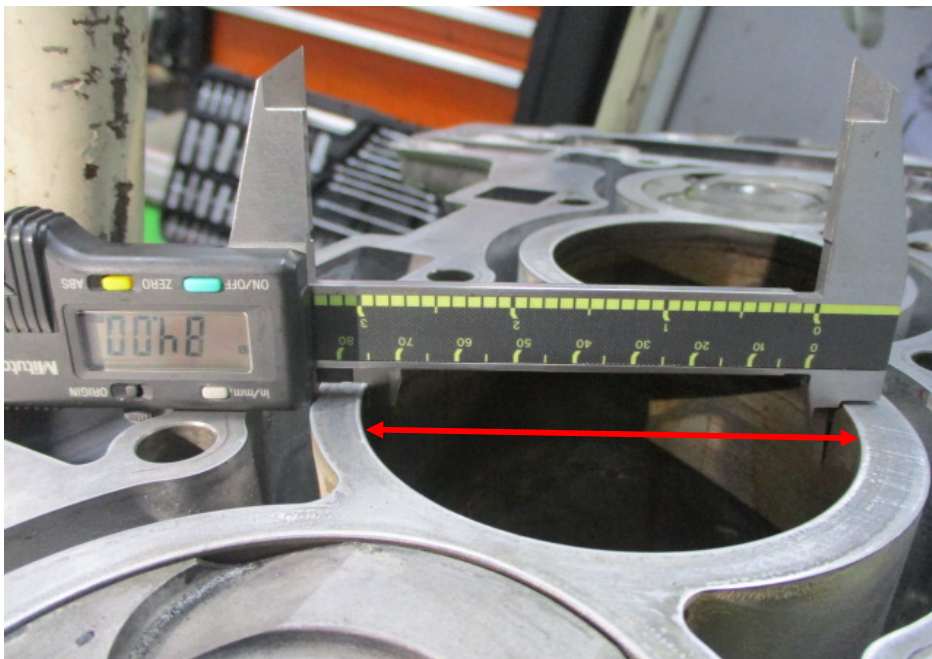
**Photo 13** shows measurement of the stroke for cylinder 2 of the BMW engine that I had inspected.



**Photo 14** shows measurement of the stroke (arrowed) for cylinder 2 of the BMW engine that I had inspected.

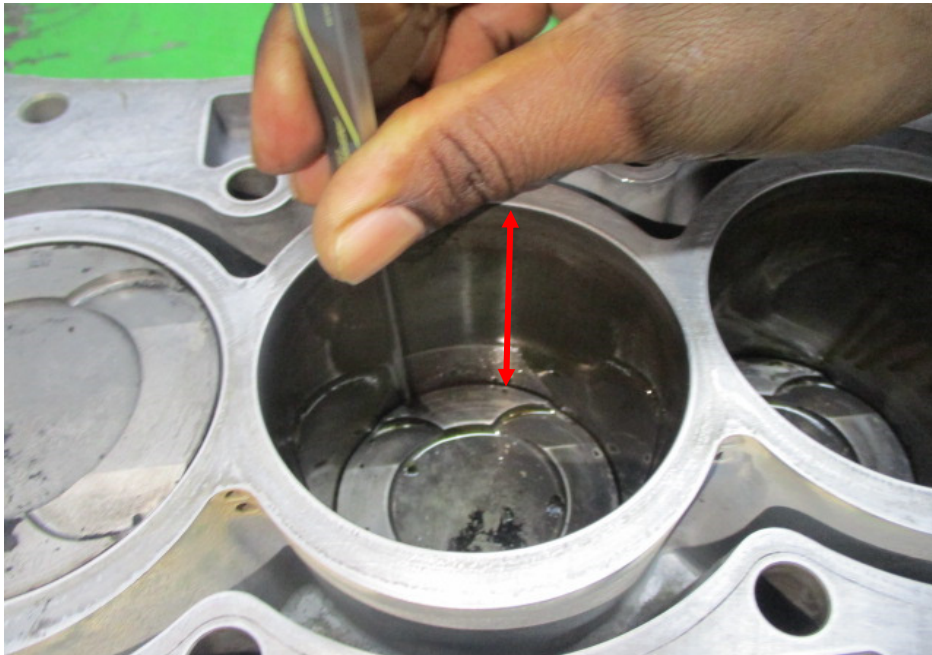


**Photo 15** shows the stroke measurement of cylinder 2, which was recorded to be 89.80mm.



**Photo 16** shows measurement being carried out to the bore (arrowed) of cylinder 3 of the BMW engine. The bore and stroke measurements of the BMW engine were carried out using a digital Vernier Caliper. The bore measurement of cylinder 3 was recorded to be 84.00mm.

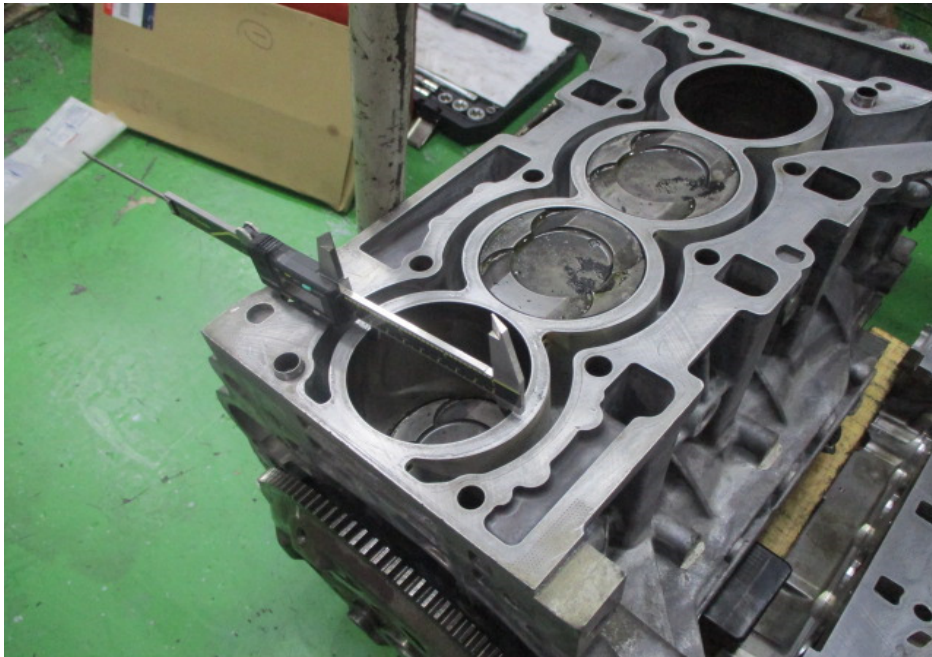




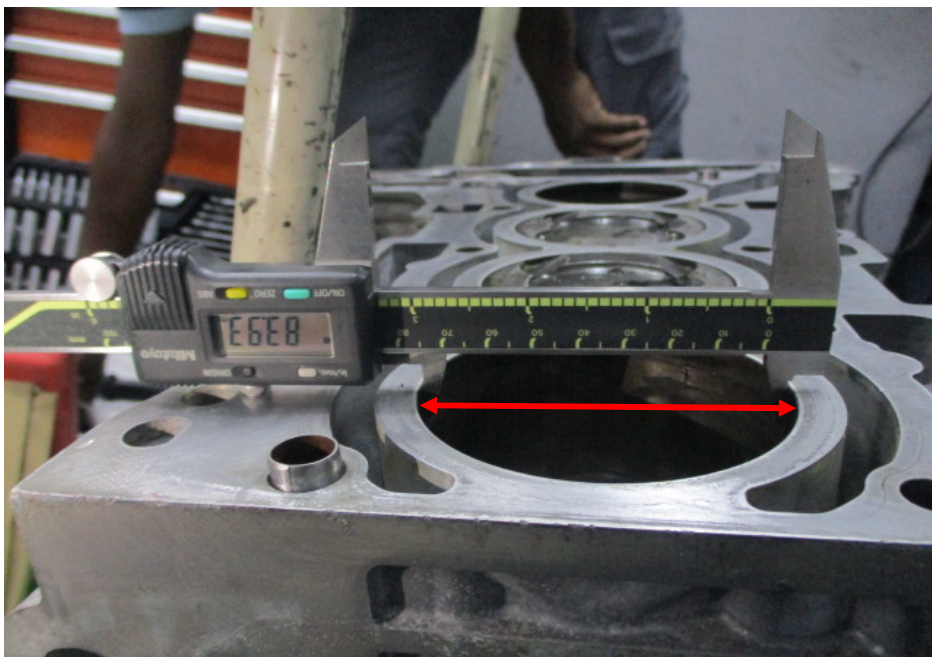
**Photo 17** shows measurement of the stroke (arrowed) for cylinder 3 of the BMW engine that I had inspected. The bore and stroke measurements of the BMW engine were carried out using a digital Vernier Caliper that was calibrated before the start of measurements.



**Photo 18** shows the stroke measurement of cylinder 3, which was recorded to be 89.87mm.

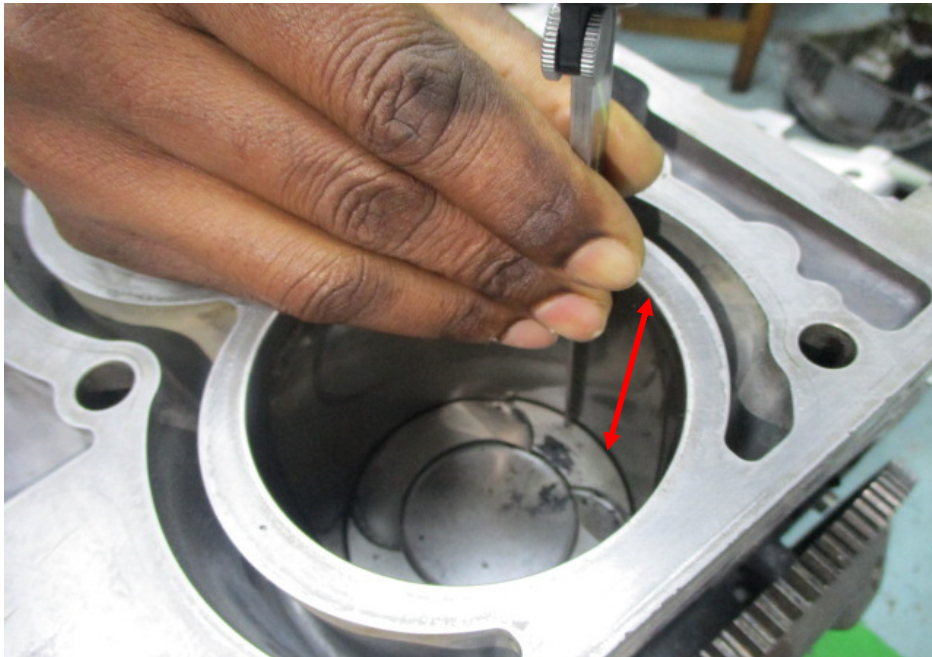


**Photo 19** shows measurement being carried out to the bore of cylinder 4 of the BMW engine. The bore and stroke measurements of the BMW engine were carried out using a digital Vernier Caliper.

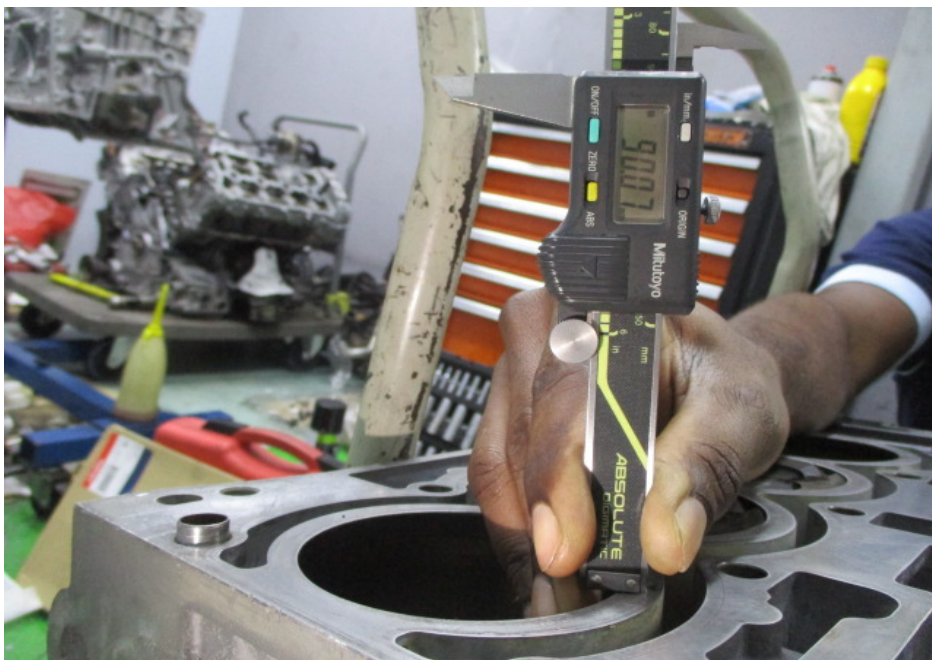


**Photo 20** shows the bore (arrowed) measurement of cylinder 4, which was recorded to be 83.93mm.





**Photo 21** shows measurement being carried out to the stroke (arrowed) of cylinder 4 of the BMW engine. The bore and stroke measurements of the BMW 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 90.07mm.

## BMW N20B Engine Technical Specifications

11. In order to determine whether the BMW engine that I had inspected was a BMW N20B model engine, I had compared the measurements of the bore and stroke of the BMW engine with the bore and stroke size of the BMW N20B model engine, as stated in its technical specifications. According to the technical specification of the BMW N20B model engine, the bore and stroke size was 84.00mm and 90.10mm respectively.
12. Upon comparison, I note that the bore and stroke measurements of the BMW engine that I had inspected (shown in paragraph 10 above) had corresponded to the bore and stroke size as stated in the technical specifications of a BMW N20B model engine. The measurements recorded from the BMW engine were all slightly lesser (at maximum 0.23mm lesser). This difference can be attributed to carbon accumulation within the cylinders, as the BMW engine that I had inspected was a used engine.
13. Since the bore and stroke size of the BMW engine had corresponded to a BMW N20B model engine, the engine displacement of the BMW engine that I had inspected would then be 1997cc. See technical specifications of BMW N20B model engines below.

## BMW N20 Engine (N20B20)

1. [Specifications](#)
2. [Overview, problems](#)
3. [Performance tuning](#)

### N20 Specs

Manufacturer	BMW Plant Hams Hall
Also called	BMW N20
Production	2011-present
Cylinder block alloy	Aluminum
Configuration	Straight-4
Valvetrain	DOHC 4 valves per cylinder
Piston stroke, mm (inch)	90.1 (3.55) ←
Cylinder bore, mm (inch)	84 (3.31) ←
Compression ratio	10 11
Displacement	1997 cc (121.9 cu in) ←



## Conclusion

14. In summary, the BMW engine that I had inspected was a BMW N20B model engine. The engine number engraved on the housing of this BMW engine was 2049C345N20B20C. The engine displacement of the BMW engine is 1997cc as per the technical specification.



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