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Test Report number:
250112822 001 Rev 02

Test Report for fuel consumption test using E2 Holdings Graphene lubricant enhancement

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1. Manufacturer Details and Scope of Application

Manufacturer's name and address	:	E2 Holdings Pte. Ltd. [redacted] New location updated after completion of the test as below; 6 New Industrial Road, #02-04, Singapore 536199
Manufacturer's representative	:	Mr. Jason Ong
Order number	:	250112822
Scope of application	:	Testing of fuel consumption for E2 Holdings Pte. Ltd. Graphene Lubricant Enhancement
Standard(s) applied	:	UN-R101.00 NEDC Test Cycle with weights as actual measured

2. Test Vehicle Information

Vehicle make	:	Kia	
Vehicle model	:	Forte	
Vehicle category	:	M1	
Year of manufacture	:	2012	
VIN	:	PNAKN1H04CG015346	
Engine number	:	G4FCCW038327	
Engine type	:	Position ignition, 4-stroke, Inline-4	
Engine capacity	:	1,591 cc	
Transmission	:	6 speed automatic	
Tyre size	:	215/45 R17	
Tyre pressure	:	2.2 bar / 32 psi	
Test vehicle mileage	:	Start of test run 01	167,990 km
		End of test run 01	168,001 km
		Start of test run 02	168,042 km
		End of test run 02	168,053 km
Mass of test vehicle in running order	:	1,336 kg	
Fuel tank capacity	:	52 L	
Type of test fuel	:	Gasoline EO	
RON	:	95	
Density of fuel at 15°C	:	0.7514 kg/L	

3. Test Laboratory and Equipment Information

Test equipment	:	Horiba Automotive emission analysis system - MEXA-ONE-DC-OV (SN: 3NVP6PPB) - CVS-ONCE-MV-HE (SN: VWE6DJ2H) - DLS-ONE-SE (SN: RL9G919E) - DLT-1020 (SN: 88N9RA99) - DLT-1230 (SN: UJ7YXKL5) - CHAM-1000 (SN: S28H26SK) - STARS VETS R1 (SN: 13HK13G0) Horiba Vulcan II EMS-CD48L 4WD – Chassis Dyno
Test method	:	According to UN-R101.00 suppl. 10; Annex 6
Driving cycle	:	New European Driving Cycle (NEDC)
Equivalent inertia mass	:	1,360 kg (according to UN-R101.00 Annex 7, table 2)
Absorbed power on the chassis dynamometer		7.0 kW at 80 km/h
Additional information		
Test location	:	National Emission Test Centre (NETC), Rawang, Malaysia
Test date	:	25th August 2022 (test run 01 – without E2 Graphene) 26th August 2022 (test run 02 – with E2 Graphene)
Witness test engineer 1	:	Lau Kah Chai
Witness test engineer 2	:	Andrew de Souza
Communication language	:	English

Reported by:

Lau Kah Chai
Test Engineer

Reviewed by:

Manfred Lotig
Vice President Mobility
South East Asia

Date:
06th Dec 2022

4. Testing Objectives, Basis and Scope of Assessment

Testing Objective, Basis and Scope of Assessment
To measure the fuel consumption of a vehicle powered by an internal combustion engine before and after using the E2 Holdings Pte. Ltd. Graphene lubricant enhancement in a controlled test laboratory condition according to UN-R101 testing procedure.

5. Testing Procedure

Testing Procedure
Markings • Visual inspection of test vehicle, VIN, tyre pressure, make and model Fuel Tank & fuel system condition • Visual inspection of entire fuel tank and fuel system condition and leakage. Fuel Consumption lubricant E2 Graphene engine oil lubricant • Visual inspection of E2 Graphene engine lubricant packing and bottle • Check bottle seal Test Vehicle Weight (kg) • Measure mass of test vehicle in unladen condition Tyres • Measure tire pressure for all tires • Record tyre make • Check tire condition for any damages Test speed and total distance recording: • Capture by NETC Laboratory equipments Fuel consumption • Fuel consumption of the vehicle was calculated based on vehicle emission values captured during the test cycle. Test Process Test run 01: Without E2 Graphene additive using NEDC test cycle on Aug 25 2022, 10:00am • Equipment calibration, dynamometer road load setting and vehicle setup • First engine oil change • Pre-condition run • Vehicle soaking (6hrs min.) • Test run 1 (without Graphene additive) according to UN-R101 • Second engine oil change, add-in Graphene additive (15ml) and run-in procedure (10~15km) • Precondition run • Vehicle soaking (6hrs min.) Test run 2: With E2 Graphene additive using NEDC test cycle on Aug 26, 2022, 10:00am • Test run 2 (with Graphene additives) according to UN-R101 • Result collection • Conduct engine oil change for test vehicle for both test runs. Remarks: • In all cases, temperature and humidity was measured during the test runs.

6. Testing Evaluations

Evaluation / Findings / Recommendations

Markings
- The vehicle make, type, category, VIN, mass, tyre size & tyre pressure was clearly recorded.

Vehicle condition -Visual inspection of entire fuel tank and fuel system
- The fuel tank and fuel system was in a good condition.
- No tampering found.

Test runs at NETC Laboratory
- No abnormalities occurred during both test run.

Remarks:
- N/A

Distance measured	Test Run 01	11.006 km
	Test Run 02	10.985 km
	Distance	21.991 km

Test results

1.	Test run 01	
	Fuel consumption on urban cycle [l/100 km]	10.21
	Fuel consumption on extra urban condition [l/100 km]	7.19
	Fuel consumption on combined [l/100 km]	8.31
	CO_2 (g/km) [combined]	196.297
2.	Test run 02	
	Fuel consumption on urban cycle [l/100 km]	9.85
	Fuel consumption on extra urban condition [l/100 km]	6.87
	Fuel consumption on combined [l/100 km]	7.97
	CO_2 (g/km) [combined]	188.374

7. Testing Summary

No.	Description	Judgement
1	Uncertainty of Measurement	Total estimated uncertainty of NETC Laboratories 3.46%
2	Conclusion	The measured Fuel consumption with the application of the E2 Graphene engine lubricant enhancement was 4.08% lower than without the application

		of the E2 Graphene engine lubricant enhancement.

8. Statement of Conformity

The testing described in this report was performed according to Customer Specific Requirements (CSR), which are explained in the test procedure.

This report does not state compliance with any legal requirements.

This report shall also not be seen as a Certification of the product.

The production quality of the product was not verified and the results are only valid for the tested vehicle described in this report.

The tests were carried out in accordance with the relevant requirements of EN ISO/IEC 17025:2017 and EN/IEC 17020:2012.

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9. Appendix: Photographic Documentation

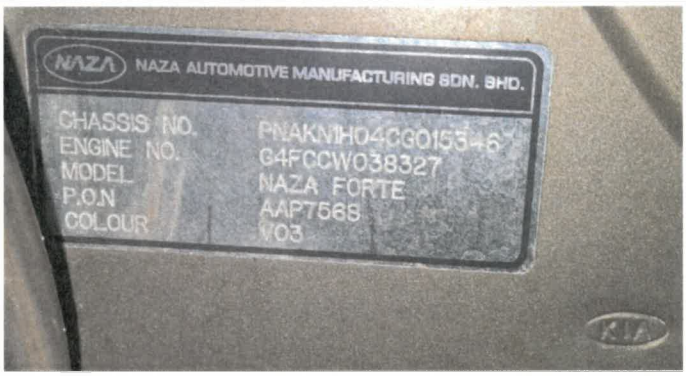
Appendix 1: NETC Laboratory

Appendix 2: Side front view of vehicle

Appendix 3: Side front view of vehicle

Appendix 4: Side rear view of vehicle

Appendix 5: Side rear view of vehicle



Appendix 6: VIN identification: PNAKN1H04CG015346

Appendix 7: Packaging Material

Appendix 8: E2 Holdings Graphene product

Appendix 9:Label

9. Verification of addition of E2 Holdings Pte. Ltd. Graphene Engine Oil Lubricant:

Verification of addition of E2 Holdings Pte. Ltd. Graphene Engine Oil Lubricant (E2 Graphene)
As per Installation manual, the E2 Graphene engine oil lubricant (15ml) was added into the engine oil top-up filler of the test vehicle. A run-in of 10~15km is required to obtain optimal performance as informed by the product manufacturer. Compatibility of the mixing of the existing or new engine oil with E2 Graphene lubricant was not part of the assessment. Compatibility of the E2 Graphene lubricant with the engine components after filling was not part of the assessment. Safety aspects have not been part of the assessment. Chemical content properties of E2 Graphene lubricant was not part of the assessment. The E2 Graphene lubricant can get top-up according to the User Manual.

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