

**REPORT ON TEST CONDUCTED ON MIRLEES BLACKSTONE 3.125 MW  
GENERATING SET AT ASHAKACEM PLC**

MAKE OF ENGINE: MIRLEES BLACKSTONE TYPE K MAJOR

ENGINE SR NO: 82-16-01

ENGINE R.P.M: 600

GEN INSTALLED  
CAPACITY: 3.25 MW

**OBJECTIVE:** To determine the efficacy of *Fuel Stick Fuel Conditioner*, a biodegradable product manufactured from Palm Tree Extract and other Plant Material that increases the Cetane Number. Calorific Value as well as reduces the Sulphur Content in the Diesel Fuel as well Petrol and LPFO and, at the same time keeps the fuel within the laid down parameters by the Petroleum Authorities of the Country *when applied to the Diesel used in the above 3.25 MW Generator.*

**CLIENT:** ASHAKACEMENT PLC

**PROCEDURE**

- ADOPTED:**
1. That Gen Set E 1 shall be isolated from the rest of the Generators and shall be run with the Fuel Stick Fuel Conditioner treated diesel fuel.
  2. That as far as possible the Unit E 1 shall be operated on a steady load to ascertain the mean consumption rate of the Unit.

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3. That due to the age of the Unit, although ideally to arrive at a maximum efficacy level, the Unit needs to be operated continuously for at least 300 hrs, due to logistical reasons, the Unit shall be operated for at least 3 days to determine the efficacy of the product.
  
4. During the test period, whilst the fuel consumption against the power generated shall be recorded, the exhaust emissions shall be observed and recoded.

**OBSERVATIONS:**


The 2<sup>nd</sup> and final test was commenced 27 November 2017 at 14.15 Hrs and all the readings of Power Generated, Fuel Consumed were recorded and the test was terminated on 01 December at 15.20 Hrs

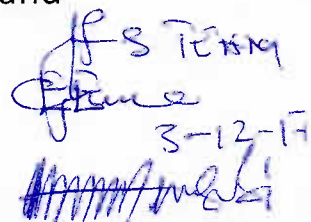
The results are as per Appendix A attached hereto.

The results may not be very accurate as during the test period it was observed that

- a) There was a substantial leakage in the fuel line which was not part of the calculations.
- b) The Stand by 250 KW Generator started every morning for say 15 to 20 minutes too was supplied Diesel fuel from the same tank under test and therefore this too needs to be incorporated in arriving at the final calculations.
- c) The FS Team was having challenges in treating the Diesel when the Day Tank was being filled up every afternoon between 14.00 HRS and 18.00 HRS as partially untreated fuel went into the system and

  
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partially diluted system went into the system. This can be evidenced from the data presented in Appendix A.

**CONCLUSION:**

As against the base line reading of 2.81 KW/LIT (March 2017 data when Diesel was used instead of LPFO), the average yield of 3.20 KW/LIT (not incorporating the daily losses due to leakage as well as consumption by the Standby 250 KW Generator) reflects an increase of 13.87 % in yield. i.e. if Diesel is at Naira 200 per litre, a reduction of Naira 27.75 per litre of Diesel used can be achieved by using Fuel Stick Fuel Conditioner.

The other major factor contributing to the Reduced value of reduction in consumption is the quality of the imported Diesel Fuel available in the Country for the last six months. It is a well known fact that the Imported Diesel Fuel has a very high content of Sulphur which in most cases exceeds the permissible 500 ppm.

In addition to above direct reduction in fuel consumption cost, further benefits would be:

- Reduced exhaust emissions (already this is evident from the emissions which are now not visible)

Reports available of tests conducted show that with the use of Fuel Stick Fuel Conditioner, the Sulphates and Nitrates emissions, both carcinogenic products are drastically reduced.

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- Reduction in maintenance cost emanating from less carbon deposits in the system. (It has been observed that in most of the cases the servicing period can be extended by between 15 to 20%)
- Reduction of 2.66 Kg of Carbon Dioxide in the atmosphere for every litre of Diesel saved.  
On every One Million litres of Diesel Fuel consumed every month, a reduction of even 13.87%, would reduce the Carbon Dioxide emissions by 400,000 Kg of Carbon Dioxide on monthly basis.

Although the average increase in yield appears to be in the region of 13.87%, in our opinion this should go up considerably once the dosing of the product is harmonised by treating the fuel in totality at source, leakages are checked as well as load factor is stabilised.

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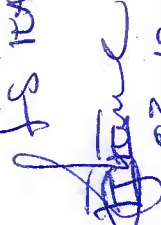
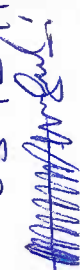
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COMMENCEMENT DATE: 27 NOVEMBER 14.15 HRS

APPENDIX A

DATE	TIME	KW READING	TOTALISER READING LTRS	FUEL CONSUMED LITRES	POWER GENERATED KW	UNITS GENERATED PER LIT	KW GENERATED PER HR	LITRES PER HOUR
27-Nov-17	14.15	318,546.00	842,998.00					
	18.20	324,758.00	844,809.00	1,811.00	6,212.00	3.43	1,521.32	443.51
28-Nov-17	12.15	352,210.00	853,292.00	8,483.00	27,452.00	3.24	1,451.21	473.47
TOTAL FOR 22 HRS		33,664.00	10,294.00			3.27	1,530.18	467.91
28-Nov-17	16.20	357,934.00	855,124.00	1,832.00	5,724.00	3.12	1,401.81	448.66
	18.20	361,016.00	856,080.00	956.00	3,082.00	3.22	1,541.00	478.00
29-Nov-17	9.30	385,190.00	863,515.00	7,435.00	24,174.00	3.25	1,593.96	490.24
	12.20	389,454.00	864,837.00	1,322.00	4,264.00	3.23	1,505.12	466.64
	14.20	392,492.00	865,800.00	963.00	3,038.00	3.15	1,519.00	481.50
	16.20	395,120.00	866,642.00	842.00	2,628.00	3.12	1,314.00	421.00

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TOTAL FOR 24 HRS		<b>37,186.00</b>	<b>11,518.00</b>					<b>3.23</b>	<b>1,549.42</b>	<b>479.92</b>
	18.00	397,586.00	867,433.00	791.00	2,466.00			3.12	1,485.54	476.51
30-Nov-17	8.00	419,262.00	874,164.00	6,731.00	21,676.00			3.22	1,806.33	560.92
	14.00	428,202.00	876,973.00	2,809.00	8,940.00			3.18	1,490.00	468.17
	16.20	431,352.00	877,982.00	1,009.00	3,150.00			3.12	1,351.93	433.05
completion of refuelling by 18 HRS										
TOTAL FOR 24 HRS		<b>36,232.00</b>	<b>11,340.00</b>					<b>3.20</b>	<b>1,509.67</b>	<b>472.50</b>
1-Dec-17	8.20	456,386.00	885,859.00	25,034.00	7,877.00			3.18	1,788.14	492.31
	12.20	462,016.00	887,720.00	5,630.00	1,861.00			3.03	1,407.50	465.25
	13.20	463,420.00	888,209.00	1,404.00	489.00			2.87	1,404.00	489.00
	14.20	464,792.00	888,628.00	1,372.00	419.00			3.27	1,372.00	419.00
	15.20	466,172.00	889,077.00	1,380.00	449.00			3.07	1,380.00	449.00
		34,820.00	11,095.00					3.14	1,513.91	482.39

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