

**RE: 484/2020**

Date Of Issue: Oct 05th, 2020

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**Applicant/Contact:** Horeb Brasil Energia e Combustíveis Ecológicos Ltda / Wilson Romão and Venâncio Gomes

**Address:** Av. das Américas # 17.150, Bloco 1, sala 414, Recreio dos Bandeirantes, Rio de Janeiro, RJ.



**Sample:** Bunker Oil **Entry Lab Date:** June 10th, 2020


**Client Identif.:** VLF50 / TQ 100 / Seal 0202759 **Collection Date/Samp:** May 25th, 2020 **Collection by the client.**

**NOTE:** Sample with Green Plus additive. **Date of service:** May 29th, 2020

Assay	Unit	Method	Result	Date of test	Specification, where applicable <i>Inform which was used:</i>  RANP 52/2010 Tab IV (380)	Uncertainty (U) or Limit of Indeterminacy (LI), if applicable <i>Inform which was used:</i>  LI*** / U****
Acidity	mgKOH/g	ASTM D664-18 e2	0,33	June 22 <sup>nd</sup> . 2020	2,5	±0,15
Water content	%m/m	ASTM D6304-16e1	0,03	June 24 <sup>th</sup> . 2020	max 0,5	±0,17
Water and Sediments	% volume	ASTM D1796-16	**	June 26 <sup>th</sup> . 2020	-	-
Ash Content	% mass	ASTM D482-19	0,003	June 29 <sup>th</sup> . 2020	max 0,1	±0,01
Sulphur content	% m/m	ASTM D5453-19	0,3	June 16 <sup>th</sup> . 2020	max 3,5	±0,26
Carbon Aromaticity Index	-	RANP 52 DE 2010	806,6	July 15 <sup>th</sup> . 2020	max 870	-
Specific mass at 15° C	kg/m <sup>3</sup>	ASTM D4052-18a	928,4	July 15 <sup>th</sup> . 2020	-	-
Specific mass at 20° C	kg/m <sup>3</sup>	ASTM D4052-18a	925,1	July 15 <sup>th</sup> . 2020	max 987,8	±0,3
Flash Point	°C	ASTM D93-19	96,1	June 29 <sup>th</sup> . 2020	min 60.0	±1,6
Micro residue of carbon	% m/m	ASTM D4530-15	7,34	June 23 <sup>rd</sup> . 2020	max 18	±0,58
Kinematics Viscosity at 50°C	mm <sup>2</sup> /s	ASTM D445-18	87,81	June 19 <sup>th</sup> . 2020	max 380	±5,022
Kinematics at 60°C	mm <sup>2</sup> /s	ASTM D445-18	55,51	June 19 <sup>th</sup> . 2020	-	-
* Pour Point	°C	Internal Method	-1	June 23 <sup>rd</sup> . 2020	max 30	-
* Aluminum	mg/kg	ICP / OES	<0,02	July 08 <sup>th</sup> . 2020	-	-
* Silicon			<0,07		-	-
Aluminum + Silicon			<0,07		max 60	-
* Sodium			1,3		max 100	±0,07
* Calcium			4,5		max 30	±0,15
* Phosphorus			0,1		max 15	±0,01
* Zinc			<0,02		max 15	-
* Vanadium			1,8		max 350	±0,03
Higher Calorific Value	MJ/kg	ASTM D240-17	44,304	June 30 <sup>th</sup> . 2020	-	-
Lower Calorific Value	MJ/kg	ASTM D240-17	41,830	October 05 <sup>th</sup> . 2020	-	-

*Hydrogen content	%	Elemental Analysis	11,66	October 02 <sup>nd</sup> ,2020	-	-
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 <p><b>LEC</b> Laboratório de Ensaios de Combustíveis-UFGM</p> <p>Antônio Carlos, 6627-Campus Pampulha-Belo Horizonte/MG-Brazil Zip Code:31.270-901 Phone: +55 (31) 3409-6650 / 6651 / 7578</p>	<h2>Test Report</h2>	
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<b>Address:</b> Av. das Américas # 17.150, Bloco 1, sala 414, Recreio dos Bandeirantes, Rio de Janeiro, RJ.					
<b>Sample:</b>	Bunker Oil	<b>Entry Lab Date:</b>	June 10 <sup>th</sup> , 2020		
<b>Client Identif.:</b>	VLF50 / TQ 100 / Seal 0202759	<b>Collection Date/Samp:</b>	May 25 <sup>th</sup> , 2020	Collection by the client.	
<b>NOTE:</b>	Sample with Green Plus additive.	<b>Date of service:</b>	May 29 <sup>th</sup> , 2020		

**Sampling or collection plan:**  
Sampling and/or collection performed by the client. Procedure not reported. The results reported here apply to the sample as received.

**Procedural deviations:**  
NA

**NOTE:**  
\* Subcontracted testing.  
\*\* Due to the dark coloration of the sample it is not possible to clearly identify the presence of sediment.


Additivation performed by LEC UFGM (Fuel testing laboratory Federal University of Minas Gerais) with additive for diesel and fuel oils **GREEN PLUS**.  
Preparation:  
The fuel + additive mixture was prepared at the customer-requested concentration of 30 mL to 100 L (150 microliters to 0.5 liter), using the following material:

- Class A volumetric flask, BVL 215, nominal capacity 1000 mL, calibrated by a laboratory belonging to RBC (Brazilian Labs Calibration Network Certified by INMETRO) (Engecal), CER58906/ 18, calibration expire date 08/2028.
- Micropipette, adjustable volume, MCP 586, nominal capacity 0.1 to 1 mL, calibrated by a laboratory belonging to the RBC (Engecal), CER18795/19, calibration expire date 05/2021.

The results presented in this report refer exclusively to the sample cited.

<b>Report:</b>	Sample complies with ANP (National Petroleum Agency) specifications for the characteristics evaluated.
<b>Decision rule of the report:</b>	Resolution ANP 5/2009 and ***Limits of Indeterminacy ANP (0.59 x Repro norms - ISO4259) and ****uncertainty declared by lab partner in blue.
<b>Interpretation:</b>	NA

NA or - : Not Applicable.



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CRQ (Chemistry Regional Council) NUMBER : 02101288

Final document.