



BV - ISO 8217 DMA

Marine Diesel – August 17, 2018



**BUREAU
VERITAS**

In August 2018, the independent and accredited laboratory Bureau Veritas analyzed a sample of Marine Gas Oil treated with **XBEE Enzyme Fuel Technology**.

The analysis demonstrated that such fuel, also known as MDO (Marine Diesel Oil) remains in compliance with the ISO 8217:2017 DMA standard.

Conclusions by Bureau Veritas:

"Testing was performed after laboratory hand-blend at 1:4000 Xbee additive doping rate, followed by two week retention period at constant temperature. The tested sample, blended with Xbee technology copes with the specification limits of DMA grade specifications according to ISO 8217:2017 standard."

Analyses	Methods	Without XBEE	With XBEE	Units	Limits
Appearance	Visual	Clear & Bright	Clear & Bright	-	Clear & Bright
Density at 15°C	ISO 12185	846.10	846.10	kg/m ³	890.00 max
Cetane index	EN ISO 4264	50.90	50.90	index	40.00 min
Viscosity at 40°C	ISO 3104:1994	3.401	3.389	mm ² /s	2.00-6.00
Flash point	EN ISO 2719	67.0	66.0	°C	60.0 min
Oxidation stability	ISO 12205	21	23	g/m ³	25 max
Sulphur content	ASTM D4394-16	0.049	0.049	% wt	1.00 max
Ash content	EN ISO 6245	<0.005	<0.005	% wt	0.01 max
Carbon residue	EN ISO 10370	0.050	0.070	% wt	0.30 max
Lubricity	EN ISO 12156-1	392	390	µm	520 max
Water content	EN ISO 12937	<0.05	<0.05	% vol	-
Fatty Acide Methyl Ester content (FAME)	EN 14078	<0.05	<0.05	% vol	-
Cloud point	ISO 3015	+4	+4	°C	-
Cold Flow Properties (CFPP)	EN 116	-2	-4	°C	-
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Analyses	Methods	Without XBEE	With XBEE	Units	Limits
Total sediments by hot filtration	ISO 10307-1	<0.01	<0.01	% wt	-
Pour point	ISO 3016	-15	-15	°C	0 max
Acidity	ASTM D-974-14	0.08	0.08	mgKOH/g	0.5 max
H2S in liquid	IP-570-14	<0.60	<0.60	mg/kg	2.00 max

Annexes

Original reports


CERTIFICATE OF ANALYSIS

N° 68180806

Operation : Testing Oil Product : Marine Diesel Oil Client : XBEE DISTRIBUTION NETWORK Contract Ref. : 797225/180704-0037 Rev0 Grade : DMA ISO 8217:2017	Sample origin : Bunkering Zone : Med. Sampling date : 27/07/2018 Sample type : Genuine prior additivation Bureau Veritas Ref. : 8139722
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Tests	Methods	Units	Results	Limits	Status
Density @ 15°C	ISO 12185	Kg/m3	846,1	890,0 max	
Appearance	Visual	-	Clear & Bright	Clear & Bright	
Sulfur Content	ASTM D-4294-16	% wt	0,049	1,00 max	
C.F.P.P	EN 116:2015	Deg C	-2	-	
Water content	EN ISO 12937	% Vol	<0,05	-	
Ash	ISO 6245:2002	w wt	<0,005	0,01 max	
Total sediments by hot filtration	ISO 10307-1	% wt	<0,01	-	
Pour Point	ISO 3016:1994	Deg C	-15	0 max	
Cetane Index	EN ISO 4264:1997	Index	50,9	40 min	
Acidity	ASTM D-974-14	mgKOH/g	0,08	0,5 max	
Cloud Point	ISO 3015:1992	Deg C	+4	-	
Lubricity, wsd at 1,4 KPa, 60°C	ISO 12156-1-2007	µm	392	520 max	
Flash Point	EN ISO 2719	Deg C	67,0	60,0 min	
Oxydation stability	ISO 12205:1996	g/m ³	21	25 max	
Viscosity @40°C	ISO 3104:1994	mm ² /s	3,401	2,000 - 6,000	
Fame Content	EN 14078:2010	% Vol	<0,05	-	
Carbon Residue (on 10%dist. Residue)	EN ISO 10370	% wt	0,050	0,30 max	
H2S in liquid	IP-570-14	mg/kg	<0,60	2,00 max	

Comments
All results matching specification limits.

Certificate of analysis issued
<p>On : 08/08/2018</p> <p>Tested on : 08/08/2018</p> <p style="text-align: right;">Adèle Bruntz</p> 

CERTIFICATE OF ANALYSIS

N° 68180808

Operation : Testing Oil Product : Marine Diesel Oil Client : XBEE DISTRIBUTION NETWORK Contract Ref. : 797225/180704-0037 Rev0 Grade : DMA ISO 8217:2017	Sample origin : Bunkering Zone : Med. Sampling date : 27/07/2018 Sample type : After hand-blend Bureau Veritas Ref. : 8139722
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Tests	Methods	Units	Results	Limits	Status
Density @ 15°C	ISO 12185	Kg/m ³	846,1	890,0 max	
Appearance	Visual	-	Clear & Bright	Clear & Bright	
Sulfur Content	ASTM D-4294-16	% wt	0,049	1,00 max	
C.F.P.P	EN 116:2015	Deg C	-4	-	
Water content	EN ISO 12937	% Vol	<0,05	-	
Ash	ISO 6245:2002	w wt	<0,005	0,01 max	
Total sediments by hot filtration	ISO 10307-1	% wt	<0,01	-	
Pour Point	ISO 3016:1994	Deg C	-15	0 max	
Cetane Index	EN ISO 4264:1997	Index	50,9	40 min	
Acidity	ASTM D-974-14	mgKOH/g	0,08	0,5 max	
Cloud Point	ISO 3015:1992	Deg C	+4	-	
Lubricity, wsd at 1,4 KPa, 60°C	ISO 12156-1-2007	µm	390	520 max	
Flash Point	EN ISO 2719	Deg C	66,0	60,0 min	
Oxydation stability	ISO 12205:1996	g/m ³	23	25 max	
Viscosity @40°C	ISO 3104:1994	mm ² /s	3,389	2,000 - 6,000	
Fame Content	EN 14078:2010	% Vol	<0,05	-	
Carbon Residue (on 10%dist. Residue)	EN ISO 10370	% wt	0,070	0,30 max	
H2S in liquid	IP-570-14	mg/kg	<0,60	2,00 max	

Comments

Testing was performed after laboratory hand-blend at 1/4000 Xbee additive doping rate, followed by two week retention period at constant temperature. The tested sample, blended with Xbee technology copes with the specification limits of DMA grade specifications according to ISO 8217:2017 standard.

Certificate of analysis issued

On : 17/08/2018

Tested on : 16/08/2018

Adèle Bruntz

