



# BV - HFO ISO 8217

*HFO 380 Cst – December 26, 2018*



**BUREAU  
VERITAS**

In December 2018, the independent and accredited laboratory Bureau Veritas analyzed a sample of Heavy Fuel Oil 380 treated with **XBEE Enzyme Fuel Technology**. The analysis demonstrated that such fuel, also known as HFO 380 / IFO 380, remains in compliance with the ISO 8217:2017 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 RMG380 grade specifications according to ISO 8217:2017 standard."*

Analyses	Methods	Without XBEE	With XBEE	Units	Limits
Density at 15°C	ASTM D 4052	989.10	989.80	kg/m <sup>3</sup>	991.00 max
Micro carbon residue	ASTM D 4530	15.80	15.60	% (w/w)	18.00 max
Viscosity at 50°C	ASTM D 445	352.30	350.80	cSt	380.00 max
Flash point	ASTM D 93	97	104	°C	60 min
Sulphur content	EN ISO 8754	1.13	0.98	% (w/w)	1.50 max
Ash content	ASTM D 482	0.029	0.027	% (w/w)	0.10 max
Water content	ASTM D 95	0.083	0.038	% vol	0.50 max
Pour point	ASTM D 97a	9	6	°C	30 max
Acidity	ASTM D 664	0.2	0.2	mgKOH/g	2.5 max
Hydrogen sulfide (H <sub>2</sub> S) in liquid	IP-570-14	<2.00	<2.00	mg/kg	2.00 max
CCAI	Calculation	850.80	850.10	quotation	870.00 max
Total sediment aged	ISO 10307-2	<0.01	<0.01	% (w/w)	0.10 max
Aluminum (Al) + Silicon (Si)	IP 470	7	7	mg/kg	60 max
Sodium (Na)	IP 470	31	31	mg/kg	100 max
Calcium (Ca)	IP 470	9	15	mg/kg	30 max
Zinc (Zn)	IP 470	3.0	3.0	mg/kg	15 max
Vanadium (Va)	IP 470	30	31	mg/kg	350 max
Phosphorous	IP 500	<2	3	mg/kg	15 max

# Annexes



















Original reports

# CERTIFICATE OF ANALYSIS

N° 68181213

Operation : Essais en laboratoire  
 Fuel grade : Bunker fuel RMG380  
 Client : XBEE DISTRIBUTION NETWORK  
 Contract Ref : 797225-181008-0041

Sample origin : shore tank CG01 Strahman valv.  
 Zone : Med  
 Sampling date : 25/08/2018  
 Sample type : Prior Xbee addition  
 Bureau Veritas Ref : 8159914 / 1

Tests	Methods	Units	Resultts	Limits	On/off Spec
Density @ 15°C	ASTM D 4052	Kg/m3	989,1	991,0 max	
Micro CCR	ASTM D 4530	% (w/w)	15,8	18 max	
Sulfur content	NF EN ISO 8754	% (w/w)	1,13	1,5 max	
Ash content	ASTM D 482	% (w/w)	0,029	0,1 max	
Water content	ASTM D 95	% Vol	0,083	0,5 max	
CCAI	Calcul	cotation	850,8	870 max	
TSA	ISO 10307-2	% (w/w)	<0,01	0,1 max	
Pour Point	ASTM D 97a	Deg C	+9	30 max	
Flash Point	ASTM D 93	Deg C	97,0	60,0 min	
Acidity	ASTM D 664	mgKOH/g	0,2	2,5 max	
H2S		mg/kg	<2	2 max	
Viscosity @ 50°C	ASTM D 445	cSt	352,3	380 max	
Al + Si	IP470	mg/kg	7	60 max	
Na	IP470	mg/kg	31	100 max	
Ca	IP470	mg/kg	9	30 max	
Zn	IP470	mg/kg	3,0	15 max	
V	IP470	mg/kg	30	350 max	
Phosphorus	IP500	mg/kg	<2	15 max	

## Comments

Results cope with specification limits. Tests were performed on genuine sample prior Xbee addition.

## Certificate of analysis issued

on : 14/12/2018

Adèle Bruntz

Tested on : 06-07/12/2018





















# CERTIFICATE OF ANALYSIS

N° 68181233

Operation : Essais en laboratoire  
Fuel grade : Bunker fuel RMG380  
Client : XBEE DISTRIBUTION NETWORK  
Contract Ref : 797225-181008-0041

Sample origin : shore tank CG01 Strahman valv.  
Zone : Med  
Sampling date : 25/08/2018  
Sample type : After Xbee addition  
Bureau Veritas Ref : 8159914 / 1

Tests	Methods	Units	Resultts	Limits	On/off Spec
Density @ 15°C	ASTM D 4052	Kg/m3	989,8	991,0 max	
Micro CCR	ASTM D 4530	% (w/w)	15,6	18 max	
Sulfur content	NF EN ISO 8754	% (w/w)	0,98	1,5 max	
Ash content	ASTM D 482	% (w/w)	0,027	0,1 max	
Water content	ASTM D 95	% Vol	0,038	0,5 max	
CCAI	Calcul	cotation	850,1	870 max	
TSA	ISO 10307-2	% (w/w)	<0,01	0,1 max	
Pour Point	ASTM D 97a	Deg C	+6	30 max	
Flash Point	ASTM D 93	Deg C	104	60,0 min	
Acidity	ASTM D 664	mgKOH/g	0,2	2,5 max	
H2S		mg/kg	<2	2 max	
Viscosity @ 50°C	ASTM D 445	cSt	350,8	380 max	
Al + Si	IP470	mg/kg	7	60 max	
Na	IP470	mg/kg	31	100 max	
Ca	IP470	mg/kg	15	30 max	
Zn	IP470	mg/kg	3	15 max	
V	IP470	mg/kg	31	350 max	
Phosphorus	IP500	mg/kg	3	15 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 RMG 380 grade specifications according to ISO 8217:2017 standard.

## Certificate of analysis issued

on : 26/12/2018

Adèle Bruntz

Tested on : 24-25/12/2018

