



**BUREAU
VERITAS**

VERIFUEL – UNDERSTANDING MARINE FUEL

2020 FUELS
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Nov 2019



Our intention is to educate and not to scare



VLSFO parameters ranges

Parameter	Results May to August 2019		
	Average	Min	Max
Visc@50°C (cSt)	151	4.21	372
Dens@15°C (kg/m ³)	947.3	881.7	985.6
Sulphur (% m/m)	0.46	0.32	0.51
Sediments (% m/m)	0.04	<0.01	0.35
Al+Si (mg/kg)	24	<2	49
Pour point	-	-18°C	27°C

Quality (October)

Parameter	VLSFO	HSFO
Visc 50°C	137	302
Dens 15°C	943.5	980.9
Sulphur	0.47	2.67
TSA	0.03	0.03
MCR	6	13
Vanadium	10	107
Sodium	13	20
Al+Si	23	23
CCAI	820	845
NSE	41.64	40.39

VLSFO viscosity in October is from **8.7 cSt to 359 cSt**

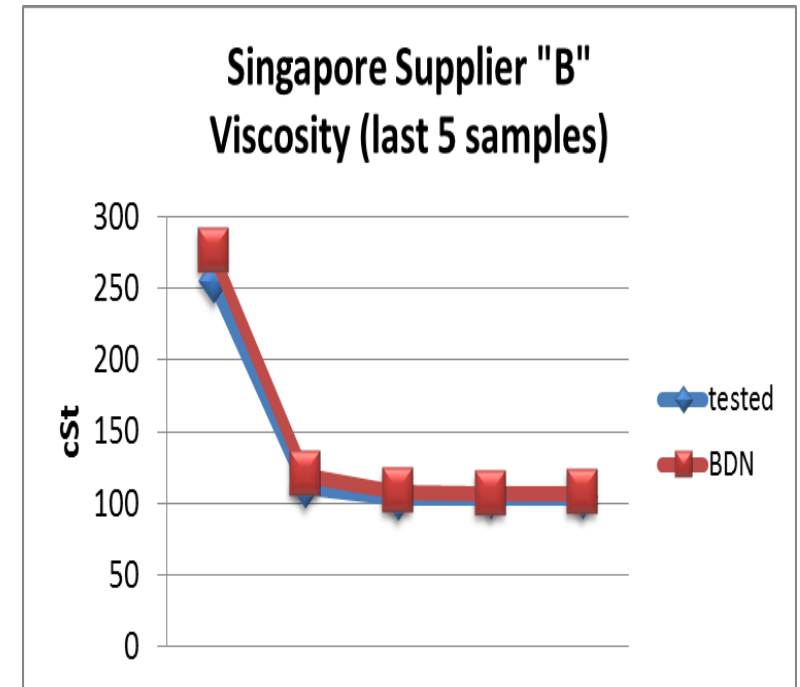
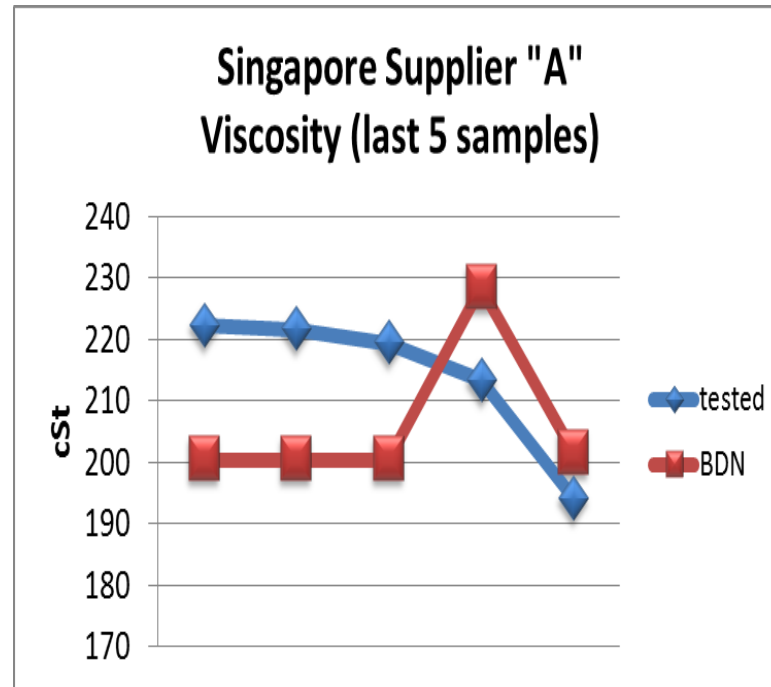
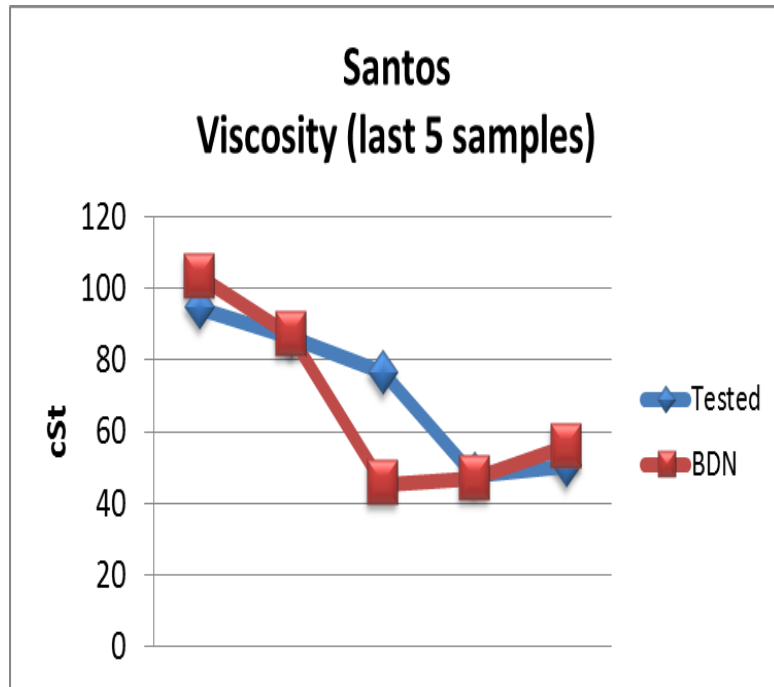
VLSFO stability – Rotterdam 20/10/2019

Test Results				ISO 8217 - RMG180	Out of Spec
Parameter	Method	Unit	Results	Specifications	ISO8217-2010/2012
Viscosity @ 50°C	ASTM D7042	cSt	112.4	Max. 180.0	
Density @ 15°C	ASTM D7042	kg/m³	929.5	Max. 991.0	
Sulphur	ISO 8754	% (m/m)	0.48	Max 0.5	
Flash Point	ISO 2719 B	°C	>67	Min. 60.0	
Acid Number	ASTM D664	mg KOH/g	0.07	Max. 2.5	
TSP	ISO 10307-2	% (m/m)	0.30	Max. 0.10	
Micro Carbon Residue	ISO 10370	% (m/m)	7.15	Max. 18.00	
Pour Point	INT 1001	°C	<21	Max. 30	
Water Content	ASTM D6304	% (V/V)	0.10	Max. 0.50	
Ash	INT 1002	% (m/m)	0.024	Max. 0.100	
Vanadium	IP 501 (mod)	mg/kg	16	Max. 350	
Sodium	IP 501 (mod)	mg/kg	12	Max. 100	
Calcium	IP 501 (mod)	mg/kg	10	Max. 30	
Zinc	IP 501 (mod)	mg/kg	1	Max. 15	
Phosphorus	IP 501 (mod)	mg/kg	<1	Max. 15	
Aluminium + Silicon	IP 501 (mod)	mg/kg	23	Max. 60	
CCAI	CCAI	-	804	Max. 870	

TSA = 0.43
TSP = 0.30
TSE = 0.25

VLSFO variations

- ✓ VLSFO quality will be different from port to port and from supplier to supplier, and sometimes from batch to batch



Can you trust BDN?

Port	Supplier	Bunker date	BDN Visc	Visc
Antwerp	United Bunkers	08-Oct	380	267
Hong Kong	Chimbusco	20-Oct	380	102
Malta	Peninsula	18-Oct	223	289
Rotterdam	Orim Energy	20-Oct	20	112
Singapore	Ocean Bunkering	10-Oct	380	64
Singapore	Ocean Bunkering	11-Oct	380	63
Singapore	Cathay Marine	16-Oct	100	44
Singapore	Ocean Bunkering	19-Oct	380	67

VLSFO parameters - CoQ 17/10/2019

CERTIFICATE OF ANALYSIS N° SEA-4957

LOCATION	:		MOVEMENT	:	Sampling
PRODUCT	:	VLSFO	REF. NO.	:	1665-1
GRADE	:	ISO-F-RMG 380			

TK :	UML Comp	Sampling	Sample N° :	Sampled
20			1	17-OCT-2019 02:10
ISO 12185	API Gravity @ 60°F (Elevated Temp.)	30.4 °API		
ISO 12185	Density @ 15°C (Elevated Temp)	873.5 Kg/m3		
ISO 2719-B	Flash Point	146 °F		
ISO 2719-B	Flash Point	63.5 °C		
ISO 3016	Pour Point	-17 °F		
ISO 3016	Pour Point	-27 °C		
EN ISO 3104	Viscosity @ 50 °C	2.888 cSt		
ISO 8754	Sulfur	0.49 Wt. %		
IP 570	Hydrogen Sulfide in Liquid	<0.4 ppm wt.		
ISO 6245	Ash	0.007 Mass %		
ISO 10370	Carbon Residue, Micro Carbon	1.49 Mass %		
ISO 3733	Water by Distillation	0.0 Vol. %		
ISO 10307-2 (B)	Total Sediment Accelerated	0.00 Wt. %		
D 664-A	Acid Number	<0.10 mg KOH/g		
IP 501	Aluminum	<1 ppm		
IP 501	Calcium	1 ppm		
IP 501	Phosphorus	<1 ppm		
IP 501	Silicon	3 ppm		
IP 501	Sodium	3 ppm		
IP 501	Vanadium	7 ppm		
IP 501	Zinc	<1 ppm		
IP 501	Aluminum & Silicon	3 ppm		
ISO 8217 Annex F1	CCAI	826		

What if? – Case 1

Case 1: Ship received compliant fuel oil as per BDN but subsequently received a fuel test report indicating non-compliance (and if after 01 Mar 2020 also in violation of the HSFO carriage ban)

Action: Issue notification to: Flag State / Bunker Port Authority / Supplier

“The representative fuel sample as taken by the vessel and tested by Bureau Veritas VeriFuel indicates that the sulphur content in the fuel is above 0.50% m/m or 0.10% m/m (for ECAs) and above the declared sulphur content on the bunker delivery note.

We hereby lodge a protest to the supplier to reserve rights for any future consequences on this matter. We hereby also notify the relevant Authorities in accordance with the requirements of MEPC.181 (59) ‘Guidelines for Port State Control under the Revised MARPOL Annex VI’.

The Authorities are hereby requested to consider initiating actions as specified in the Revised MARPOL Annex VI.”

What if? – Case 2

Case 2: MARPOL sample is the supplier's responsibility and its seal number should be reflected on the BDN. What if suppliers deliver a MARPOL sample to the vessel that was not witnessed?

Some operators decided as a standard operating procedure to always issue notification to: Flag State / Bunker Port Authority / Supplier

The MARPOL Annex VI sample(s) was/were not taken at receiving ship's manifold as per MEPC.182 (59).

We hereby lodge a protest to the supplier to reserve rights for any future consequences on this matter. We hereby also notify the relevant Authorities in accordance with the requirements of MEPC.181 (59) "Guidelines for Port State Control under the Revised MARPOL Annex VI".

VLSFO compatibility – Ust Luga 17/10/2019

Mixing	TSA on blend (% m/m) ISO 10307-2	Result
VLSFO / HFO (10:90)	0.02	Compatible
VLSFO / HFO (50:50)	0.04	Compatible
VLSFO / HFO (70:30)	0.17 (TSP: 0.18)	Non - compatible
VLSFO / HFO (80:20)	0.19	Non - compatible
VLSFO / HFO (90:10)	0.18 (TSP:0.18)	Non - compatible
VLSFO / MGO (50:50)	0.01	Compatible
VLSFO / MGO (70:30)	0.02	Compatible
VLSFO / MGO (80:20)	0.02	Compatible

VLSFO
 22 cSt, 897kg/m³, 0.50% S,
 MCR 2.44%, TSA 0.02%

HFO
 450 cSt, 988kg/m³, 2.67% S,
 MCR 14%, TSA 0.04%

MGO
 3 cSt, 866kg/m³, 0.07% S

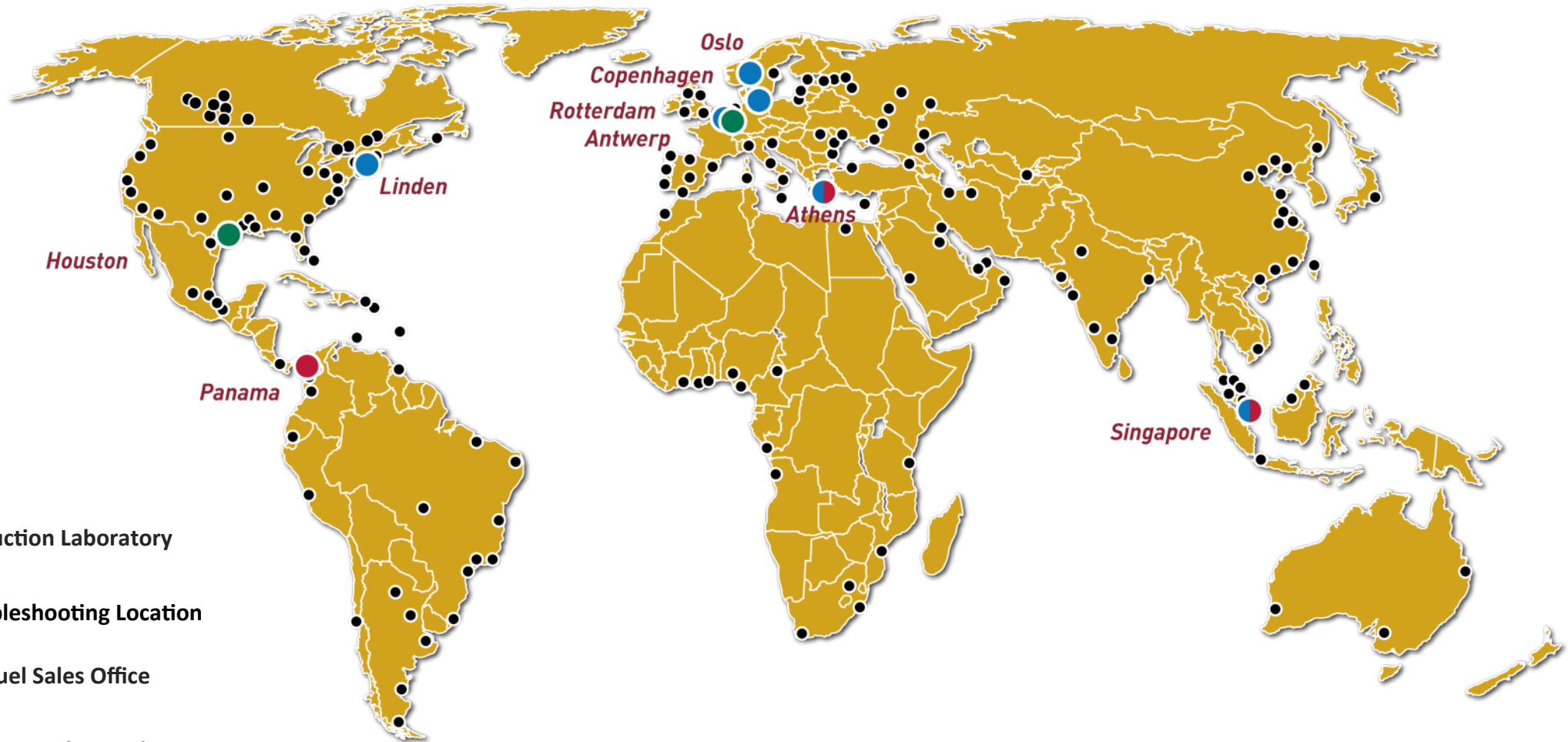
Preparing our Crews for 2020 fuels





- ✓ **Optimum fuel management:** Huge variations in **viscosity, density and cold flow properties**. Things change
- ✓ **Compatibility:** Segregating each fuel by avoid mixing, unless compatibility is guaranteed by supplier or by VeriFuel
- ✓ Do not burn the fuel until the analysis is available, if possible
- ✓ Study Certificate of Quality (CoQ) carefully before bunker operation. Key message: know your fuel
- ✓ Do not be afraid to report immediately, initial “teething” issues
- ✓ With proper preparation, planning and training, the technical challenges can be managed.



VeriFuel Global Network

Oil & Gas Lab Network



-  Production Laboratory
-  Troubleshooting Location
-  VeriFuel Sales Office
-  Oil & Petrochemical Location



Thank you for your
attention

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