

FOBAS Fuel analysis report

Nordic White Diesel (NWD 450) - Phase 2 Investigative analysis - Preliminary analysis

Our Reference	204059511	Report Status:	Green
Vessel/Site	Storage Tank	IMO:	Not applicable
Sample Dispatch Date	NOT STATED		
Lab Receipt Date	22/06/2020		
Courier Used	DHL		
Dispatched From	Oslo		

Sample No	1
Port	NWD Test Sample
Sampling Date	NOT STATED
Supplier	Nordic White
Barge/Inst	Not Applicable
Sample Point Type	Storage facility
Sampling Method	NOT STATED

Advised Details	Water in Fuel Emulsion
Seal Number Lab	2608739

Test Results for comparative purposes		Comparative	Tested	Test Method
ISO-F Grade(2010/12)		ISO DMA Spec.	NWD 450	
		DMA		
K Viscosity at 40oC	cSt	2.0 Min / 6.0 Max	4.56	ISO 3140
Density @ 15°C	kg/l	0.8900 Max	0.852	ISO 12185
Water Content	% v/v		12.00	ISO 12937
Ash Content at 550oC	% m/m	0.01 Max	< 0.010	ISO 6245
Micro Carbon Residue	% m/m	0.30 Max	< 0.010	ISO 10370
Total Sediment Existent	% m/m		< 0.01	ISO 10307-1
Net Specific Energy	MJ/kg		37.18	ISO 8217 Calc
Gross Specific Energy	MJ/kg		39.89	ISO 8217 Calc
Colour	n/a		Green	Visual
Appearance			Opaque	Visual
Sulphur Content	% m/m	0.10 Max	< 0.030	ISO 8745
Pour Point	°C	0 Max	< -9	ISO 3016
CFPP	°C MGO 0.05 stock reported as -11 d		Unobtainable	ASTM D6271
Flash Point	°C	60 Min	>70	ISO 2719
MCR 10%	% m/m	0.30 Max	Unobtainable	ISO 10370
Cetane Index	Index	40 Min	Unobtainable	ISO 4264

Phase 2 Programme - sample source Seal 2608735

Copper corrosion 60C (4h)	°C	1a	1a Passed	ISO 2160
Steel corrosion 60C	°C	1	1 Passed	ASTM D665a
Water and Sediment Centrifugation	%v/v		No separation	ASTM D1796
Oxidation Stability	g/m3	25 max	unfilterable	ISO 12205
Adherent Insolubles			12	ISO 12205

Filterable Insolubles			unfilterable in time limit	ISO 12205
Ignition Quality Test			on hold	IP 498
Cetane Number (CFR)		40 min	on hold	ISO 5165
Lubricity WSD	µm	(previous sample Ref:207025111) 520 max	212	ISO 12156-1
TAN	mgKOH/g	(previous sample Ref:207025111)	0.19	ASTM D664
SAN	mgKOH/g	(previous sample Ref:207025111)	0.0	ASTM D664

Comments: The following comments are based on the sample as supplied and tested parameters carried out in accordance to the defined test methods.

1. When compared against the DMA specification results of tests carried out in full are consistent with that expected of a distillate DMA grade, noting the water emulsion effect on reducing the energy/ mass value
2. In comparing with the earlier report Ref: 207025111 of ; the comparable results show a consistency in the delivered product with this sample, noting that the Flash point is above the minimum required for a marine fuel
3. Cold flow properties of CFPP may be requested from the main petroleum blend certificate of quality , but is understood to be in the region of -11 dec C
- 4 Test marked on 'On hold' are as a result of concerns expressed by the lab as to the impact of the WD emulsion on the test equipment, and may not be carried out
5. Water and Sediment Centrifuge test was reported unsuitable because no phase separation was noted. This however could be positively interpreted as the strength of the emulsion to hold together under extreme centrifugal forces, such forces may be
6. Oxidation stability test, normally used for biodiesel, was carried out to see if this emulsion fuel under the stress of the oxidation test would be adversely impacted in its condition. The original diesel base stock is delivered within the limits of max 25 g/m3. This fuel however was not able to filter in the given time period so the total insolubles could not be calculated, although the adherent insolubles were well within the limit, the filterable insolubles could not be measured. The implications of this is not fully known due to a lack of onboard operational experience and testing of such fuels. However as with all marine fuels long term storage should be avoided. This bears no direct implication on the combustion of the fuel and its suitability for use; however a point for further discussion and if considering long term storage in extreme ambient conditions

Note: the test programme used test methods designed for fuel oils derived predominantly from petroleum. This water emulsion fuel may have had adverse effects on some of the final results and or may result in the test not being able to be completed because of the impact of the water content, these have been defined as unobtainable. Therefore test method given precision may not be fully applicable. Results should be considered indicative only.

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