Marine Clean Fuel Program

Fuel Right Rx

Fuel Right Global

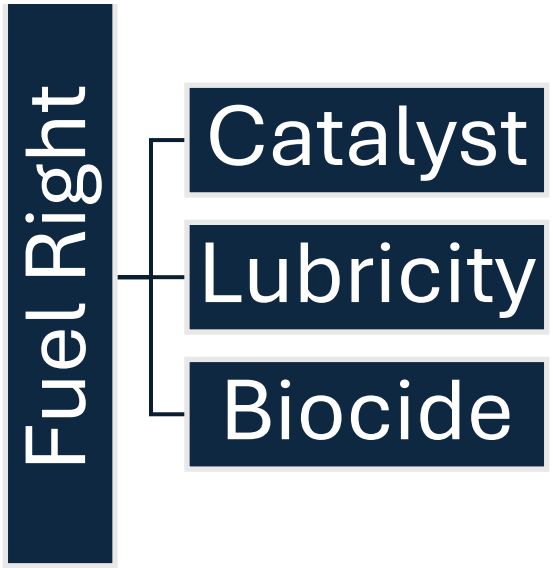
Wilmington, DE

2025

About Us

- 30 years in business
- USA manufacturer
- Fuel Additives
- Proprietary blends
- In-house research lab
- Serve multiple markets
- International experience
- GHS/REACH/OSHA/WHMIS

Disruptive Technology



Clean Fuel - free of sludge contamination, corrosion by-products and water from the source of supply enhances the performance of the overall system by reducing maintenance and eliminating factors affecting engine performance.

Fuel Right

Products

30K concentrate

- 1:30.000

15K

- 1:15.000
- With fuel line anti-freeze

ProActive

- 1:10.000
- With enhanced lubricity

PRO+ ACTIVE
BY/PAR FUEL RIGHT

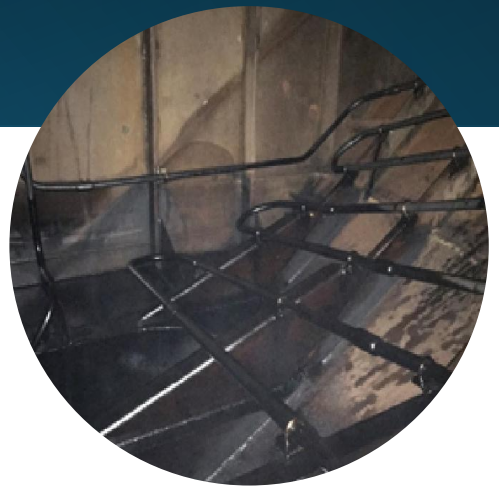
Fuel Right Rx

Engine Experience

- MAK
- Daihatsu
- Hyundai Himsen
- Guangzhou
- Wartsila
- ITO
- NIIGATA
- Caterpillar
- Cummins
- MAN
- Volvo Penta
- Henan
- Yanmar
- Hitachi
- DMD Man B&W
- MTU
- Sulzer
- Wechai

Fuel Right Rx

Clean Fuel Tanks




ELIMINATE BIO-SLUDGE

ELIMINATE PRESSURE WASHING

REDUCED ENVIRONMENTAL WASTE

PROTECTION FROM CORROSION

Fuel Right Rx

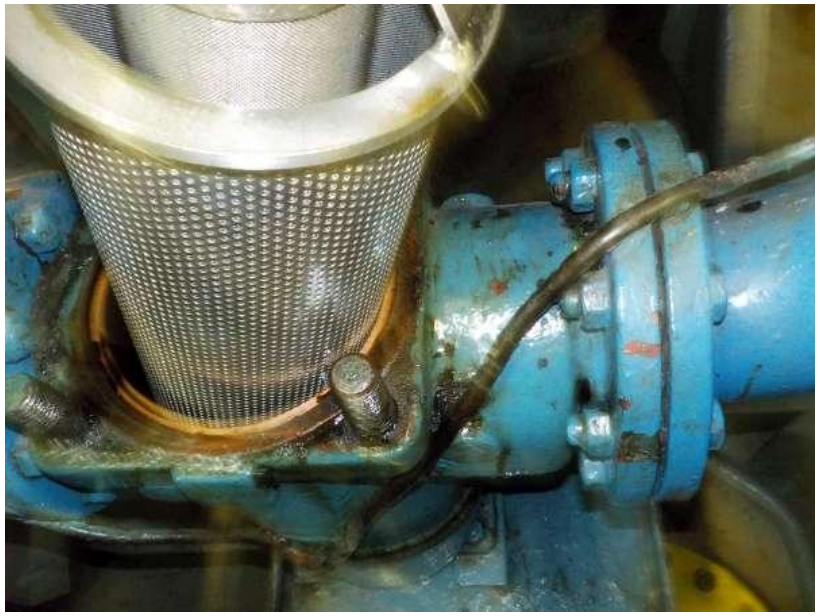
Longer service intervals between rebuilds

Extended Injector Life

Clean purifiers, strainers, filters

- Extended service intervals
- Reduced deposit build up on strainers
- Reduced wear on purifiers components

Strainers



Fuel Rx

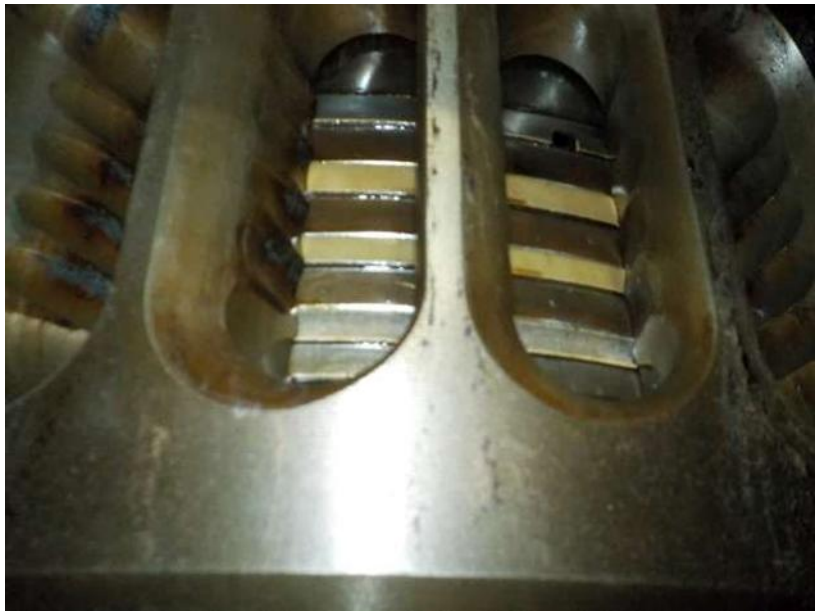
M/V Sheila Ship Engineer

- “routine cleaning of filters and purifiers they told me not very dirty. long-term during our routine inspection for under piston and scavenge space is much better”
- “We would definitely be interested in the long-term usage”

Images provided by M/V MSC Sheila

Elin Poseidon
(ELIN Shipping)

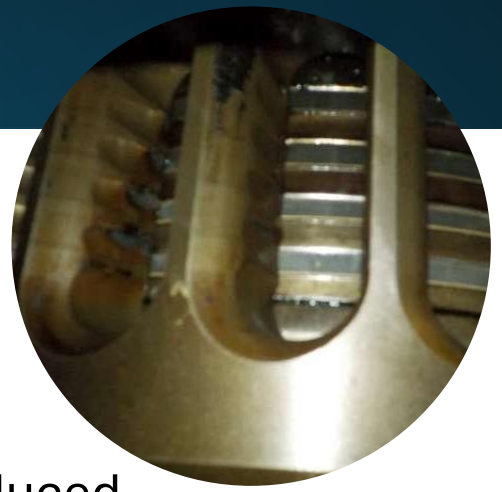
8.000 hours with minimal scoring



Images provide by Elin Ship

No hard carbon deposits

Reduced Carbon Deposits



- Reduced carbon deposits in exhaust ports, exhaust valves, cylinder crown and skirts
- Reduced cylinder scoring
- Improved lubricating oil life

Fuel Right Rx

Cleaner Fuel

ULTRA CLEAN FUEL PROGRAM

ISO 4406

- Removal of excess water
- Break down of suspended particulate
- Enhance ISO 4406 fuel cleanliness values

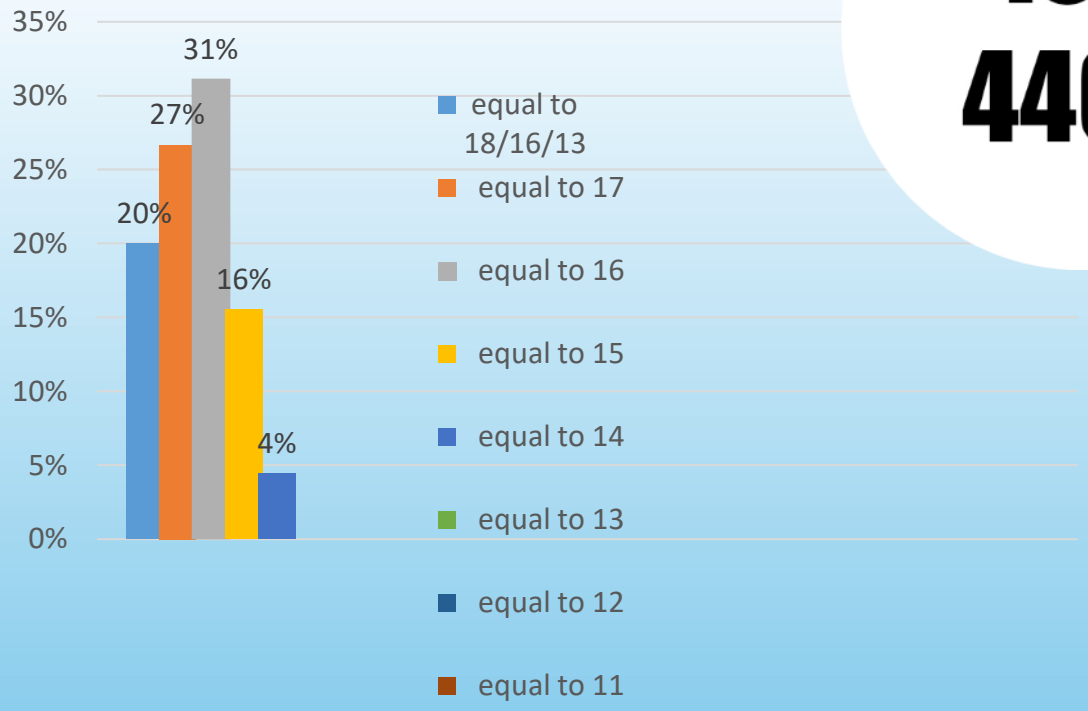
Fuel Right Rx

ISO code numbers	Type of system	Typical components	Sensitivity
23 / 21 / 17	Low pressure systems with lar	Ram pumps	Low
20 / 18 / 15	Typical cleanliness of new hy from the manufacturer. Low pressure heavy industria applications where long-life is	Flow control valves Cylinders	Average
19 / 17 / 14	General machinery and mobile sy Medium pressure, medium capacity	Gear pumps/motors	Important
18 / 16 / 13	World Wide Fuel Charter cleanliness standard for diesel fuel delivered from the filling station nozzle. High quality reliable systems General machine requirements	Injector valve and high pressure pumps/ motors Directional and pressure control valves	Critical
17 / 15 / 12	Highly sophisticated systems and hydrostatic transmissions	Proportional valves	Critical
16 / 14 / 11	Performance servo and high Pressure long-life systems e.g. Aircraft machine tools, etc.	Industrial servovalves	Critical
15 / 13 / 09	Silt sensitive control system with very high reliability	High performance servovalves	Super critical

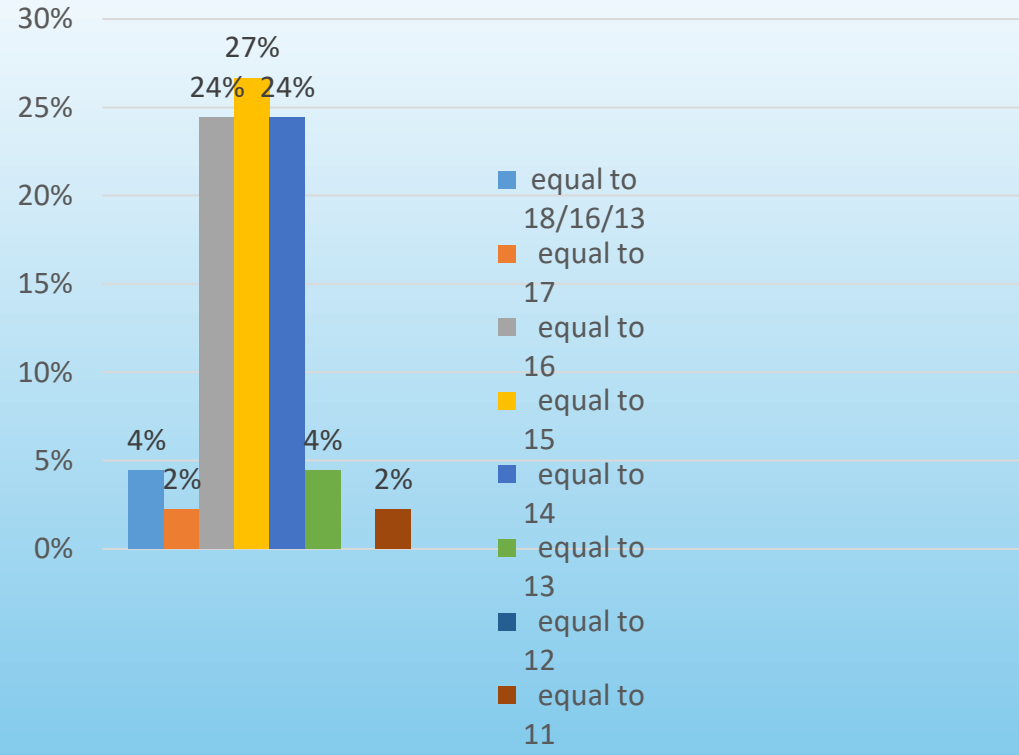
ISO 4406

ISO 4406

ISO 4406 of base fuel (45 samples)



ISO 4406 with FuelRight (45 samples)

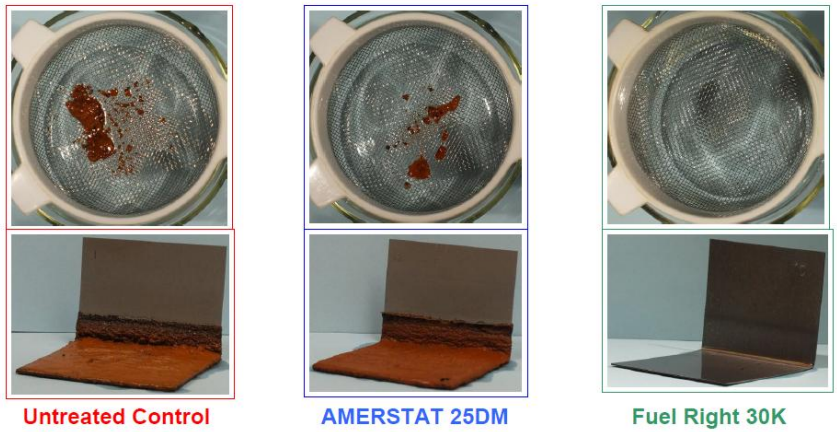


78% < 18
51% < 17
20% < 16

83% < 18
81% < 17
57% < 16

Sludge/Corrosion jar tests* comparison

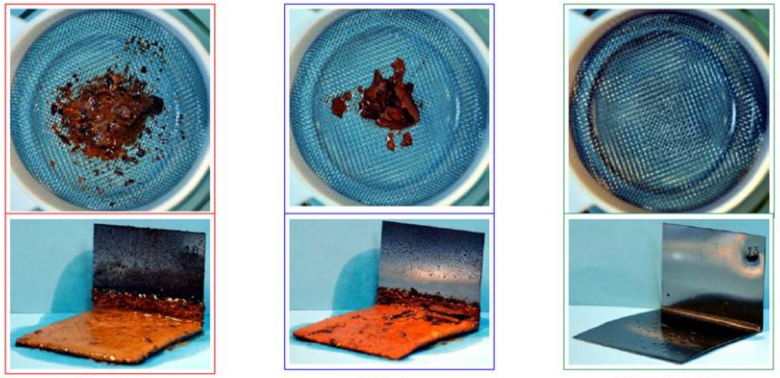
Jar Test Results – Series XLVIII
(18 Months ending 8/25)
AMERSTAT® 25DM (Drew Marine®)



Untreated Control | AMERSTAT 25DM | Fuel Right 30K

SCORES:	Sludge Growth	Corrosion	TOTAL
Control	2	2	4
AMERSTAT	5	5	10
Fuel Right	10	10	20

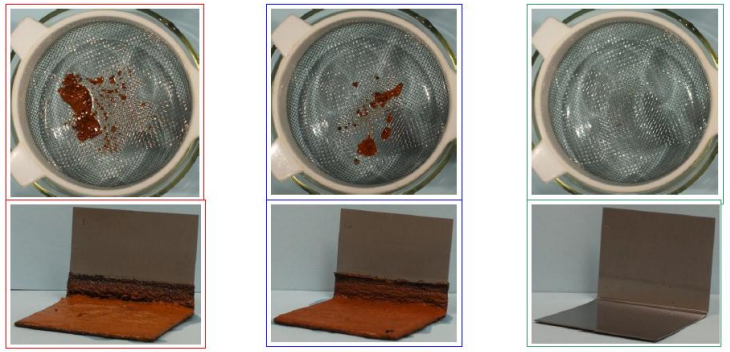
Jar Test Results – Series XX
(18 Months ending 03/09)
Pri-D (Power Research)



Control | Pri-D | Fuel Right

SCORES:	Coupon	Strainer	Corrosion	TOTAL
Control	2	2	2	6
Pri-D	1	5	2	8
Fuel Right	10	10	10	30

Jar Test Results – Series XLVIII
(18 Months ending 8/25)
AMERSTAT® 25DM (Drew Marine®)



Untreated Control | AMERSTAT 25DM | Fuel Right 15K

SCORES:	Sludge Growth	Corrosion	TOTAL
Control	2	2	4
AMERSTAT	5	5	10
Fuel Right	10	10	20

* Jar tests were developed and conducted by FuelRight

Determination of the filterability (Filter Blocking Tendency-FBT)

- ASTM D2068
- IP 387

- Standard test method for filter blocking tendency of distillate fuel oils
- This test method describes a procedure for determining the filter blocking tendency (FBT) of distillate fuel oils where the end use demands an exceptional degree of cleanliness.

Fuel Type	Standard Reference	Acceptable FBT Value	Remarks
Marine Distillate (DMA/DMB)	ISO 8217:2017 & 2024	**≤ 2.52**	Higher values indicate poor cleanliness or instability.
FAME Blends (up to B20)	EN 590 + Annex	≤ 2.52 (sometimes ≤ 2.00 preferred)	Oxidation stability or poor handling may increase FBT.

ANALYTICAL REPORT

Bureau Veritas Inspección y Testing S.L.
(Unipersonal) C.I.F.: ESB08658601
Laboratorio de análisis – Huelva
Polígono Industrial Nuevo Puerto S/N.
Palos de la Frontera, Huelva, Spain
959 369 335
CTDHuelvaLab@bureauveritas.com

Job No	23748-1	^Date of Sampling	---
^Customer	Prio Biocombustiveis*	Date of Reception	15-Jun-2023
^Grade	B7	Reported Date	15-Jun-2023
^Origin	---	Sample Package and Capacity	Bottle Glass Clear 500.00 mL
^Id	B7 + 60ppm Fuel Right 30K-EU	^Seal No	---
		^Y/Ref	---
		Item Description	Petroleum Products

After Additivation - Cargo Treatment			
ESOJNJ23001891-017			
Test	**Method**	**Unit**	**Result**
Free Water	IP 387B/17	--	-
Volume Pumped	IP 387B/17	mL	120
Final Pressure	IP 387B/17	kPa	105
FBT	IP 387B/17	--	2.69

AUTHORIZED SIGNATURE

Itziar Martinez, Laboratory Manager

. REPORT

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Palos de la Frontera, Huelva, Spain
959 369 335
CTDHuelvaLab@bureauveritas.com

Job No	23748-2	^Date of Sampling	---
^Customer	Prio Biocombustiveis*	Date of Reception	15-Jun-2023
^Grade	B7	Reported Date	15-Jun-2023
^Origin	---	Sample Package and Capacity	Bottle Glass Amber 500.00 mL
^Id	B7 + 100ppm Fuel Right 30K-EU	^Seal No	---
		^Y/Ref	---
		Item Description	Petroleum Products

After Additivation - Cargo Treatment			
ESOJNJ23001891-019			
Test	**Method**	**Unit**	**Result**
Volume Pumped	IP 387B/17	mL	130
Final Pressure	IP 387B/17	kPa	105
FBT	IP 387B/17	--	2.52

Reduced Emissions

Element	(g/kWh)	(g/kWh)	%
NOx	11.909	11.672	-1.99
SO_2	0.103	0.051	-50.93
CO	0.666	0.623	-6.54
CO_2	611.140	631.683	3.36
O_2	1350.104	1431.703	6.04
HC	0.623	0.247	-60.28
PM2.5>	0.056	0.033	-40.68
PM2.5-PM10	0.010	0.007	-21.92
PM<10	0.012	0.007	-38.85
PM Total	0.079	0.049	-38.17

Study completed by Istanbul Technical University – Marine Institute

Fuel Economy

Reported by our customers

- Ditas – 4%
- ELIN Shipping – 12%
- China Energy – 6%
- Independent Tug – 10.5%

China Energy
Shen Hua Profile

- 40 Ships
- RMK fuel (IFO 380)
- Average consumption 25 MT per day
- Daily Consumption
  - HSFO $12,178/DAY
- Annual Consumption per ship (200 days)
  - $2,435,600 / ship

- Fuel Right 30K – 1:30,000 treatment Ratio
- Cost for treatment $3.136/MT
- 6% Reported fuel economy improvement
- 6% x 2,435,600 = USD $146,136
- Annual cost of treatment
  - USD $24,000
- Total savings USD $122,136 per ship
- Total fleet savings
  - 40 x $122,136= *$4,885,440*

China Energy
Shen Hua Emissions

- Test study provided
  - China Classification Society (CCS)
  - GB/T2589-2008: General principles for calculation of the comprehensive energy consumption
  - GB/T13234-2009: Enterprise energy saving calculation method
  - Other methods included for emission calculations
- ↓ 653.18 tons CO^2
- ↓ 2.10 tons SOx
- ↓ 17.55 tons NOx

Field measurements in a 2-stroke ship engine

The determination of fuel consumption can be done by the following methods:

- Use of data from fuel flow meters installed on board.
- Measurement of exhaust emissions using appropriate portable equipment and calculation of fuel consumption using the 'Carbon balance' method.
- The components of the exhaust gas that can be measured are CO2, CO, HC, while additional pollutants (NOx (NO, NO2), SOx can be measured.
- Measurement of exhaust gas flow and air-fuel equivalence ratio (λ) (method under development and evaluation), using appropriate portable equipment.

- Consumption shall be expressed both in absolute fuel mass delivery units (kg/h or tn/day) and in specific fuel consumption (BSFC or SFOC) (g/kWh).
- The measured fuel consumption shall be corrected by the calorific value of the standard fuel.

Field measurements in a 2-stroke ship engine

- Elemental analysis of the fuel is necessary, which ideally includes the carbon content and hydrogen content, and the lower calorific value of the fuel used.
- Fuel consumption will be determined at the following operating points (loads) of the engine: 10%, 25%, 50%, 75%, 90%.
- As a reference, it would be ideal to make available data from shop tests and sea trials.

DATA TO BE RECORDED

Actual Fuel Oil Data

- Total fuel oil consumption
- Fuel Oil consumption main engine
- Fuel oil consumption auxiliaries
- Fuel Characteristics (LHV, Density etc)

Main Engine Data

- Propeller Pitch (%)
- Propeller RPM (RPM)
- Shaft Torque/Power (kW)

Actual Navigation Data

- Ship position (lat/long)
- Course over Ground (C.O.G.) (°)
- Speed over Ground (S.O.G.) (KN)
- Speed Through Water (S.T.W.) (KN)
- True Wind Speed (m/s)
- True Wind Direction (°)
- Water Under Keel (m)

Cargo Data

- Cargo Loaded (Carried) (t)
- Draught FWD (m)
- Draught Aft (m)
- EEOI (gr/ton.miles)

Emissions

- CO2 – port
- CO2 – starboard
- CO - port
- CO – starboard
- CxHy – port
- CxHy – starboard
- SOx –Port
- SOx – starboard
- H2S - port
- H2S – starboard
- NOx – port
- NOx - starboard
- O2 – port
- O2 - starboard

Running Voyage Fuel Oil Data

- Total FOC Main Engine this voyage (t)
- Total FOC Auxiliaires this voyage (t)
- Total VLSFO consumption this voyage (t)
- Total MGO consumption this voyage (t)

Total Counters

- Distance (Nm)
- All Fuel Oil (T)
- VLSFO (T)
- MGO (T)
- Total Main Engine (T)
- Total Auxiliaries (T)

Particulates

- Total
- Opacity
- PM10
- PM2.5

Ship Missions and Sea Conditions Example

Ship Missions and Sea Conditions		Voyages		
		I	II	III
Transit A (Calm Sea State: SM = 5%)	Ship Speed V_A (kn)	13.90	12	10
	Time T_A (h)	4.27	7.89	7.89
	Sea Margin SM_A (-)	1.05	1.05	1.05
Transit B (Heavy Sea State: SM = 30%)	Ship Speed V_B (kn)	12	12	10
	Time T_B (h)	5.26	5.26	5.26
	Sea Margin SM_B (-)	1.3	1.3	1.3
Transit C (Normal Sea State: SM = 15%)	Ship Speed V_C (kn)	13.66	12	10
	Time T_C (h)	38.62	41.02	51.85
	Sea Margin SM_C (-)	1.15	1.15	1.15
The whole transit voyage	Average Ship Speed (kn)	13.50	12.00	10.00
	Total Transit Time (h)	48.15	54.17	65.00
	Total Transit Distance (n mile)	650	650	650
	Average Sea Margin (-)	1.15	1.15	1.15

Thank You

Questions?

Fuel Right Rx