

Summary Report for

dated **11-Sep-2018**

OIL RATING

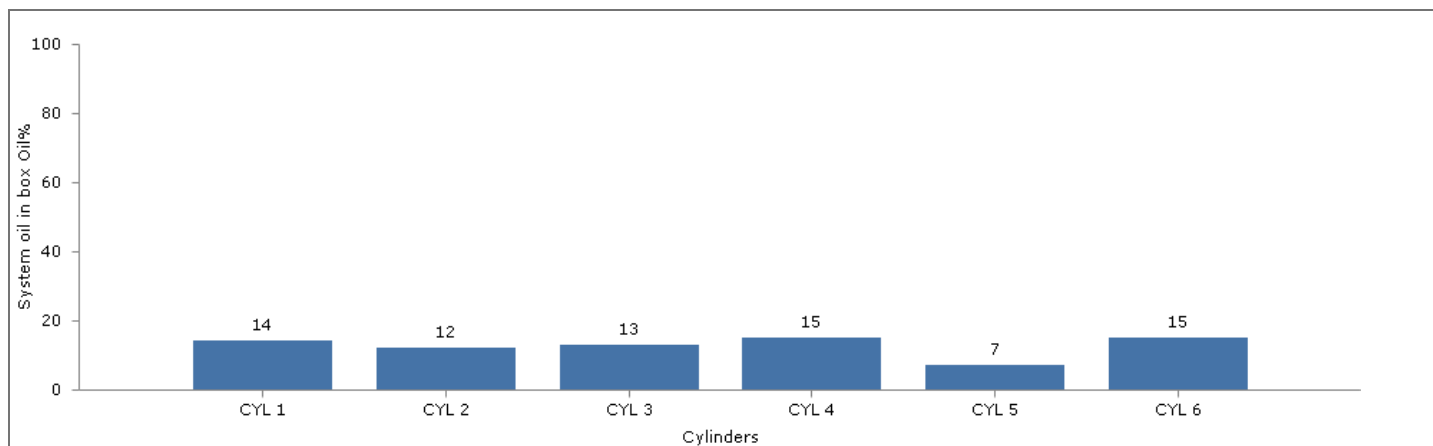
Remaining reserve of alkalinity (BN) in the oil is adequate. Contaminant elements Sodium, Aluminium and Silicon might be originated from the HFO. Vanadium and Nickel are HFO derived elements.

UNIT RATING

PQ and elemental Fe results suggest that the Iron level is within the acceptable limit.

Stuffing box performance

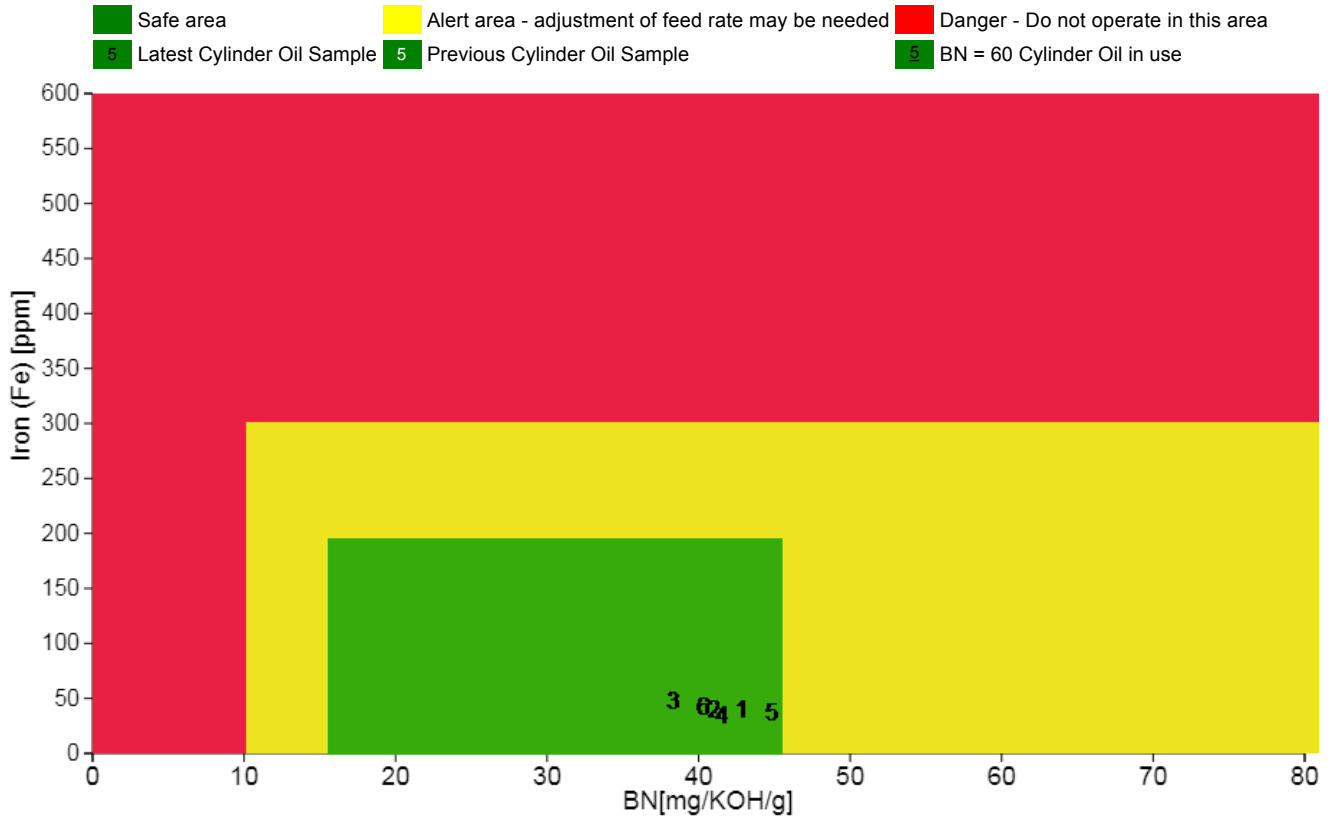
The stuffing box performance is evaluated by the share of System Oil in scrape down sample landed per unit.



MAIN ENGINE [CYLINDER SCRAPEDOWN]

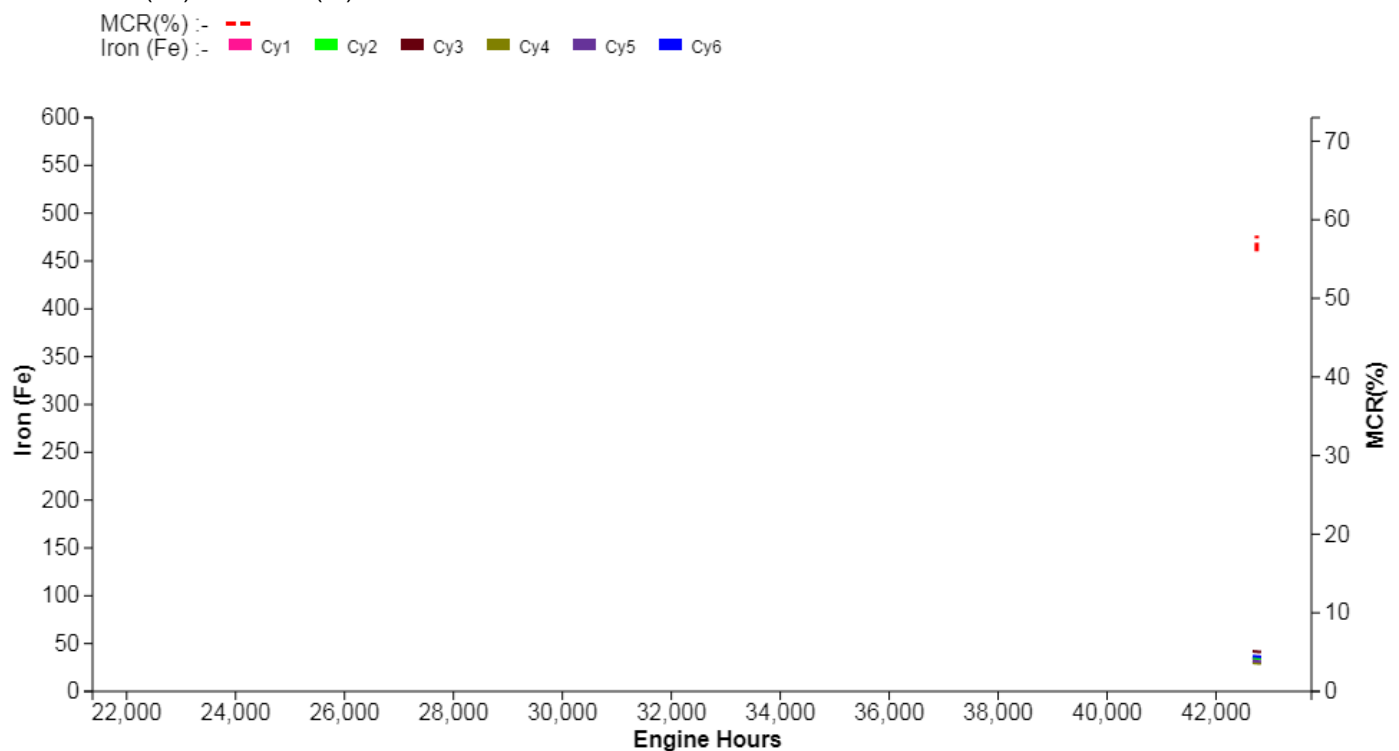
Manufacturer	: MAN B&W	Model	: 6S50MC-C 9,480KW@127rpm
Fuel (Sulphur[%wt])	: (3.50%)	Lubricator	: ATLAS
Lubricant in Use	: TARO SPECIAL HT 70	Recommended	: TARO SPECIAL HT 70

Drain Oil BN vs. Iron (Fe)



The result of the latest cylinder scavenge drain oil sample is indicated by a black number identifying the cylinder unit of the engine. Any previous results of each cylinder unit are represented by a white number. Underlined cylinder sample numbers (e.g. 5) show results for cylinder oil samples of a low BN Cylinder Oil of BN = 60 mgKOH/g; if not underlined a Cylinder Oil of BN > 60 mgKOH/g is used. For further details either check the summary page containing all data from past main engine cylinder scrapedown analyses or refer to the trend report for the individual cylinder number.

Drain Oil Iron (Fe) and MCR (%)



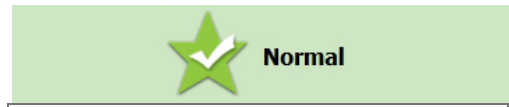


MAIN ENGINE [CYLINDER SCRAPEDOWN]

Manufacturer	: MAN B&W	Model	: 6S50MC-C
Fuel (Sulphur[%wt])	: (3.50%)	Recommended	: TARO SPECIAL HT 70
Lubricant in Use	: TARO SPECIAL HT 70		

	CYL 1	CYL 2	CYL 3	CYL 4	CYL 5	CYL 6
Sample Number						
Date Sampled	21-Jul-18	21-Jul-18	21-Jul-18	21-Jul-18	21-Jul-18	21-Jul-18
Date Dispatched	03-Sep-18	03-Sep-18	03-Sep-18	03-Sep-18	03-Sep-18	03-Sep-18
Dispatched From	Mozambique Port	Mozambique Port	Mozambique Port	Mozambique Port	Mozambique Port	Mozambique Port
Date Received	09-Sep-18	09-Sep-18	09-Sep-18	09-Sep-18	09-Sep-18	09-Sep-18
Sampling Point	CYLINDERS	CYLINDERS	CYLINDERS	CYLINDERS	CYLINDERS	CYLINDERS
Sampled By	2 / E	2 / E	2 / E	2 / E	2 / E	2 / E
Engine Hours	42747	42747	42747	42747	42747	42747
Liner Hours	42747	42747	42747	42747	42747	42747
Crown Hours	42747	42747	42747	42747	42747	42747
Piston Ring Hours	1123	5928	5916	5916	5916	6481
Fuel Valve Hours	50	7255	638	6955	1123	6815
Feed Rate[g/kW/h]	1.50	1.50	1.50	1.50	1.50	1.50
Fuel, Sulphur [%wt]	3.50	3.50	3.50	3.50	3.50	3.50
Sp. FRF[g/kW/h/%wt]	0.43	0.43	0.43	0.43	0.43	0.43
Load[%MCR]	55.90	55.90	55.90	55.90	55.90	55.90
Rpm[min^{-1}]	108.50	108.50	108.50	108.50	108.50	108.50
Analysis						
Appearance[-]	Dark	Dark	Dark	Dark	Dark	Dark
BN[mgKOH/g]	42.4	40.6	37.9	41.1	44.4	39.9
BN(corr)[mgKOH/g]	46.9	44.1	41.4	45.7	46.6	44.3
KV@100°C[mm^2/s]	19.34	18.70	18.07	18.01	18.63	18.25
KV@100°C(corr)[mm^2/s]	20.84	19.80	19.13	19.25	19.22	19.56
Flash Point[°C]	>200	>200	>200	>200	>200	>200
Water[%wt]	0.60	0.60	0.60	0.60	0.60	0.60
Soot/Insoluble[%]	0.30	0.40	0.30	0.40	0.40	0.40
Sys. Oil Dilution[%]	14	12	13	15	7	15
PQ Index/2ml[-]	23	21	22	18	19	21
PQ Index/2ml (corr)	24	21	22	18	19	21
Wear Elements [ppm]						
Aluminium (Al)	6	6	6	5	6	6
Chromium (Cr)	2	1	2	2	1	3
Copper (Cu)	17	16	38	4	4	15
Iron (Fe)	33	33	40	28	30	35
Iron (Fe) (corr)	37	36	44	31	31	39
Lead (Pb)	1	1	1	1	<1	1
Tin (Sn)	1	1	1	1	1	1
Contaminant Elements [ppm]						
Sodium (Na)	24	24	32	24	25	30
Silicon (Si)	31	30	32	28	30	33
Molybdenum (Mo)	1	1	1	1	1	2
Nickel (Ni)	25	26	35	22	23	33
Silver (Ag)	<1	<1	<1	<1	<1	<1
Vanadium (V)	93	95	122	87	90	124

MAIN ENGINE [CYLINDERS] [Cylinder No 1]



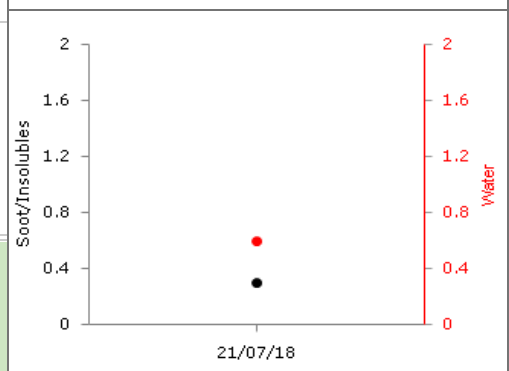
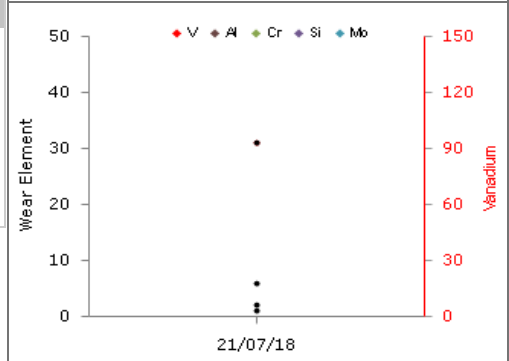
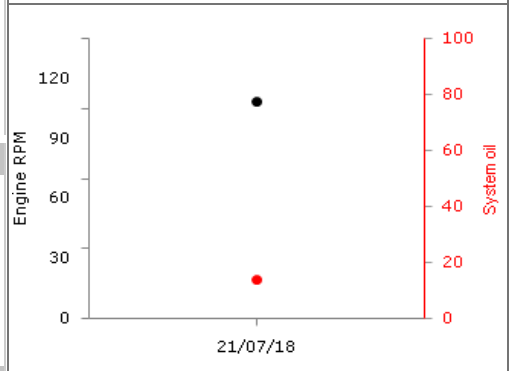
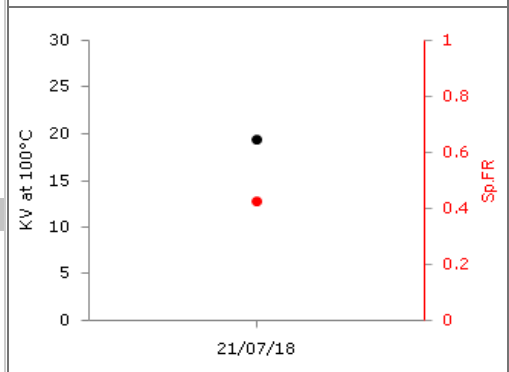
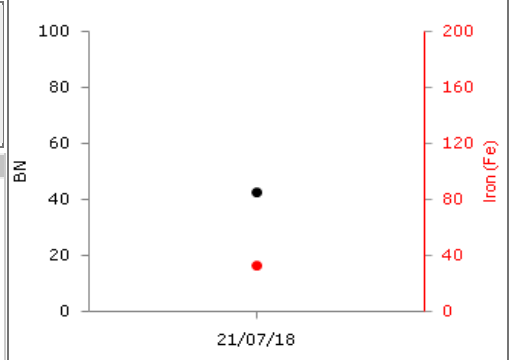
Manufacturer	: MAN B&W	Model	: 6S50MC-C
Port Landed	: Mozambique Port	Volume(ltr)	: 11000
Fuel Grade	:	Dispatched	: 03-Sep-18
Sampled By	: 2 / E	Received	: 09-Sep-18
Lubricant in Use	: TARO SPECIAL HT 70	Recommended	: TARO SPECIAL HT 70

Sample Details	1 (Current)	2	3
Rating	Normal		
Sample No	18074890		
Sampled Date	21-Jul-18		
Engine Hours	42747		
Liner Hours	42747		
Crown Hours	42747		
Piston Ring Hours	1123		
Feed Rate[g/kwh]	1.50		
Fuel,Sulphur[%wt]	3.50		
Sp. FR[g/kW/h/%wt]	0.43		
Load[%MCR]	55.90		
Rpm[min^{-1}]	108.50		

New Oil	OEM	System Oil	Analysis
70.0		Dark	Appearance Dark
21.0		14.8	BN[mgKOH/g] /(Corr) 42.4 /46.9
270		12.63	KV@100°C[mm^2/s] /(Corr) 19.34 /20.84
		>200	Flash Point[°C] >200
		<0.05	Water[%wt] 0.60
		0.20	Soot/Insoluble[%wt] 0.30
			Sys.Oil Dilution[%] 14
		16	PQ Index/2ml /(Corr) 23 /24

Wear Elements [ppm]			
1	Aluminium (Al)	6	
<1	Chromium (Cr)	2	
4	Copper (Cu)	17	
7	Iron (Fe) /(Corr)	33 /37	
1	Lead (Pb)	1	
1	Tin (Sn)	1	

Contaminant Elements [ppm]			
9	Sodium (Na)	24	
7	Silicon (Si)	31	
<1	Molybdenum (Mo)	1	
4	Nickel (Ni)	25	
<1	Silver (Ag)	<1	
14	Vanadium (V)	93	

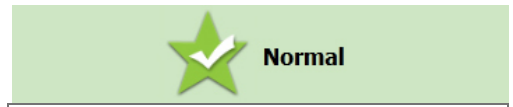


Oil Rating:
Remaining reserve of alkalinity in the oil is adequate. Contaminant elements Sodium, Aluminium and Silicon might be originated from the HFO. Vanadium and Nickel are HFO derived elements.

Unit Rating:
PQ and elemental Fe results suggest that the Iron level is within the acceptable limit.

Action:
No action required.

MAIN ENGINE [CYLINDERS] [Cylinder No 2]



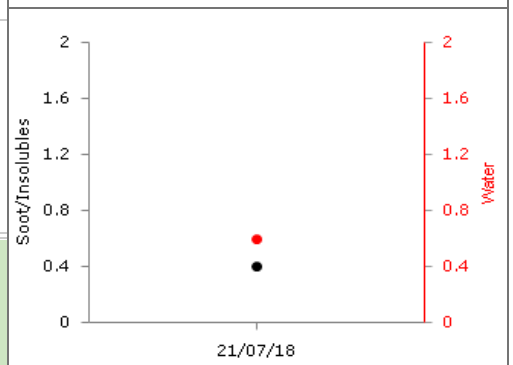
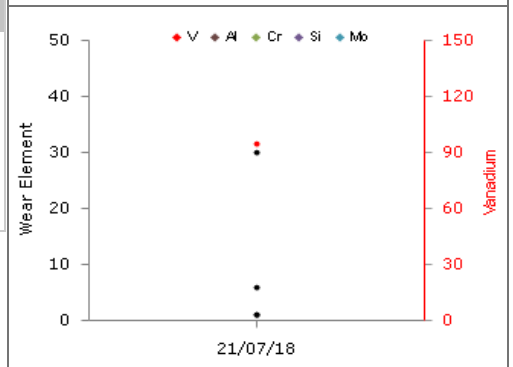
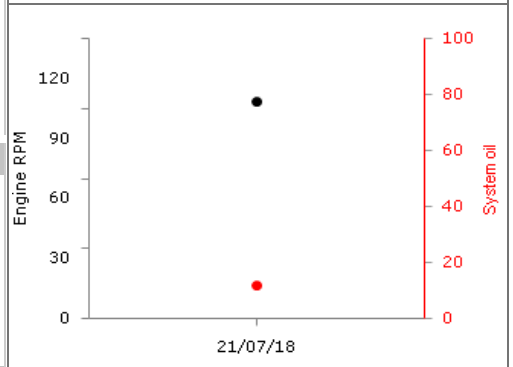
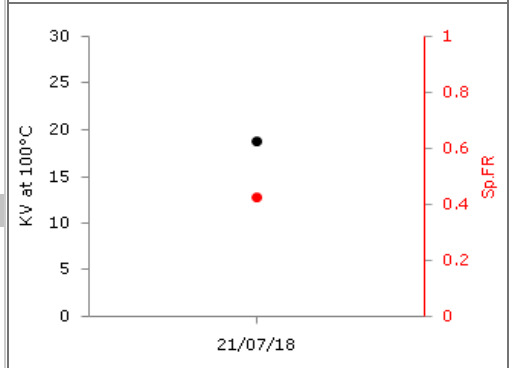
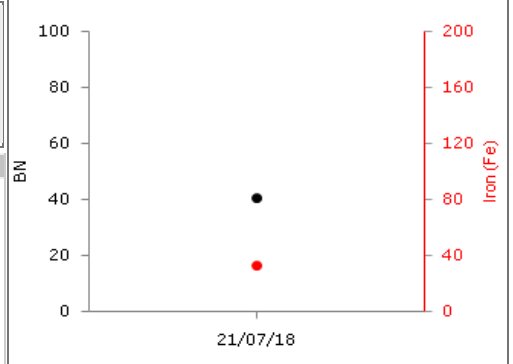
Manufacturer	: MAN B&W	Model	: 6S50MC-C
Port Landed	: Mozambique Port	Volume(ltr)	: 11000
Fuel Grade	:	Dispatched	: 03-Sep-18
Sampled By	: 2 / E	Received	: 09-Sep-18
Lubricant in Use	: TARO SPECIAL HT 70	Recommended	: TARO SPECIAL HT 70

Sample Details	1 (Current)	2	3
Rating	Normal		
Sample No	18074891		
Sampled Date	21-Jul-18		
Engine Hours	42747		
Liner Hours	42747		
Crown Hours	42747		
Piston Ring Hours	5928		
Feed Rate[g/kwh]	1.50		
Fuel,Sulphur[%wt]	3.50		
Sp. FR[g/kW/h/%wt]	0.43		
Load[%MCR]	55.90		
Rpm[min^{-1}]	108.50		

New Oil	OEM	System Oil	Analysis
70.0		Dark	Appearance Dark
21.0		14.8	BN[mgKOH/g] /(Corr) 40.6 /44.1
270		12.63	KV@100°C[mm^2/s] /(Corr) 18.70 /19.80
		>200	Flash Point[°C] >200
		<0.05	Water[%wt] 0.60
		0.20	Soot/Insoluble[%wt] 0.40
			Sys.Oil Dilution[%] 12
		16	PQ Index/2ml /(Corr) 21 /21

Wear Elements [ppm]			
1	Aluminium (Al)	6	
<1	Chromium (Cr)	1	
4	Copper (Cu)	16	
7	Iron (Fe) /(Corr)	33 /36	
1	Lead (Pb)	1	
1	Tin (Sn)	1	

Contaminant Elements [ppm]			
9	Sodium (Na)	24	
7	Silicon (Si)	30	
<1	Molybdenum (Mo)	1	
4	Nickel (Ni)	26	
<1	Silver (Ag)	<1	
14	Vanadium (V)	95	

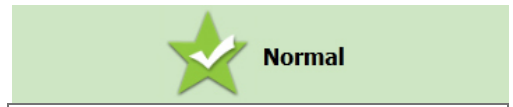


Oil Rating:
Remaining reserve of alkalinity in the oil is adequate. Contaminant elements Sodium, Aluminium and Silicon might be originated from the HFO. Vanadium and Nickel are HFO derived elements.

Unit Rating:
PQ and elemental Fe results suggest that the Iron level is within the acceptable limit.

Action:
No action required.

MAIN ENGINE [CYLINDERS] [Cylinder No 3]



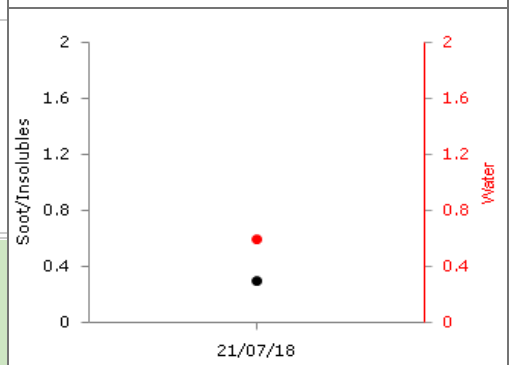
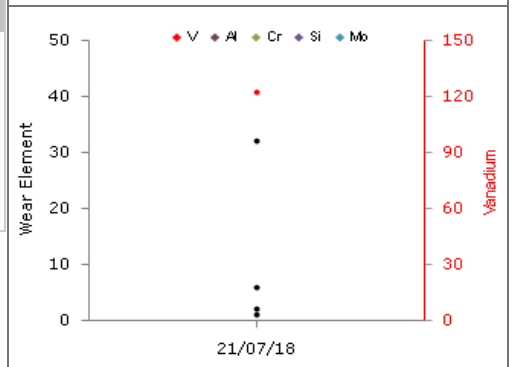
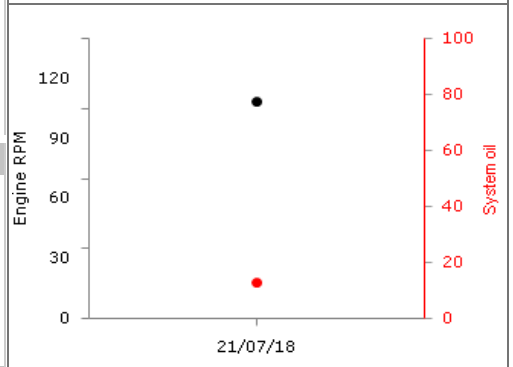
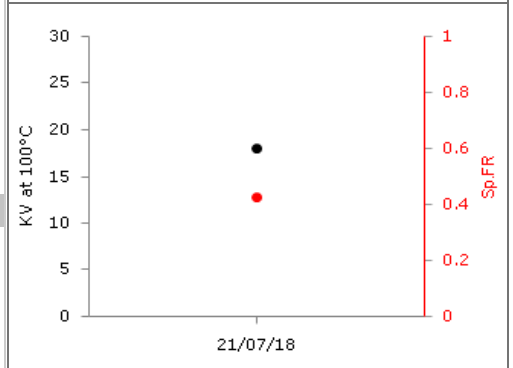
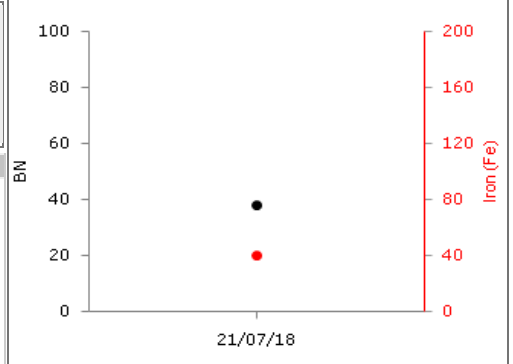
Manufacturer	: MAN B&W	Model	: 6S50MC-C
Port Landed	: Mozambique Port	Volume(ltr)	: 11000
Fuel Grade	:	Dispatched	: 03-Sep-18
Sampled By	: 2 / E	Received	: 09-Sep-18
Lubricant in Use	: TARO SPECIAL HT 70	Recommended	: TARO SPECIAL HT 70

Sample Details	1 (Current)	2	3
Rating	Normal		
Sample No	18074892		
Sampled Date	21-Jul-18		
Engine Hours	42747		
Liner Hours	42747		
Crown Hours	42747		
Piston Ring Hours	5916		
Feed Rate[g/kwh]	1.50		
Fuel,Sulphur[%wt]	3.50		
Sp. FR[g/kW/h/%wt]	0.43		
Load[%MCR]	55.90		
Rpm[min^{-1}]	108.50		

New Oil	OEM	System Oil	Analysis
70.0		Dark	Appearance Dark
21.0		14.8	BN[mgKOH/g] /(Corr) 37.9 /41.4
270		12.63	KV@100°C[mm^2/s] /(Corr) 18.07 /19.13
		>200	Flash Point[°C] >200
		<0.05	Water[%wt] 0.60
		0.20	Soot/Insoluble[%wt] 0.30
			Sys.Oil Dilution[%] 13
		16	PQ Index/2ml /(Corr) 22 /22

Wear Elements [ppm]			
1	Aluminium (Al)	6	
<1	Chromium (Cr)	2	
4	Copper (Cu)	38	
7	Iron (Fe) /(Corr)	40 /44	
1	Lead (Pb)	1	
1	Tin (Sn)	1	

Contaminant Elements [ppm]			
9	Sodium (Na)	32	
7	Silicon (Si)	32	
<1	Molybdenum (Mo)	1	
4	Nickel (Ni)	35	
<1	Silver (Ag)	<1	
14	Vanadium (V)	122	

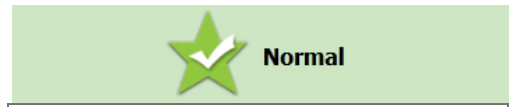


Oil Rating:
Remaining reserve of alkalinity in the oil is adequate. Contaminant elements Sodium, Aluminium and Silicon might be originated from the HFO. Vanadium and Nickel are HFO derived elements.

Unit Rating:
PQ and elemental Fe results suggest that the Iron level is within the acceptable limit.

Action:
No action required.

MAIN ENGINE [CYLINDERS] [Cylinder No 4]



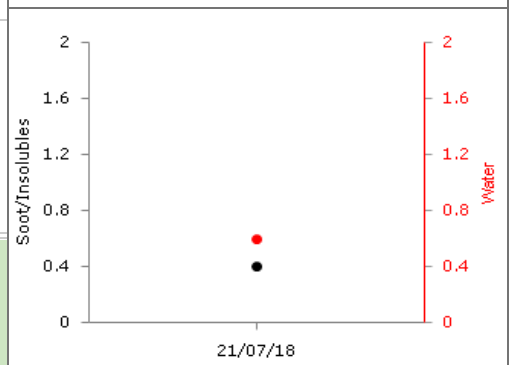
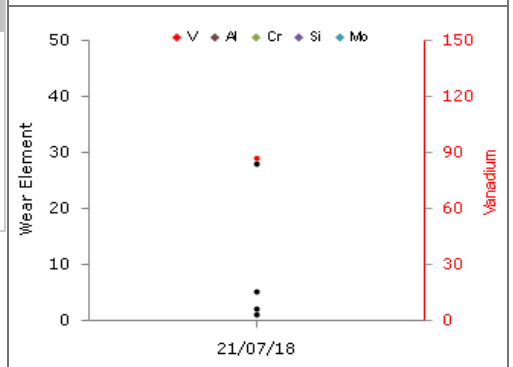
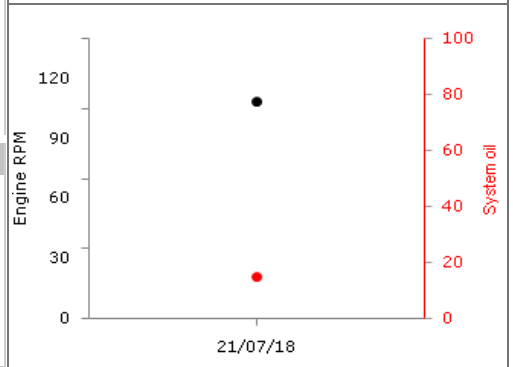
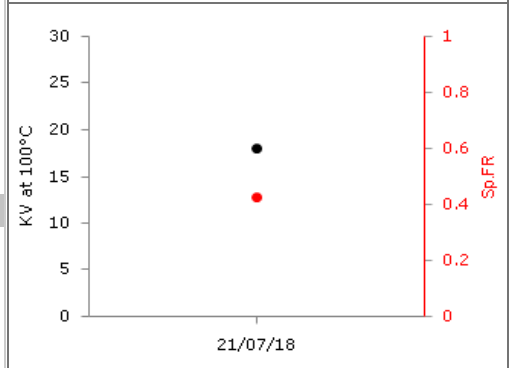
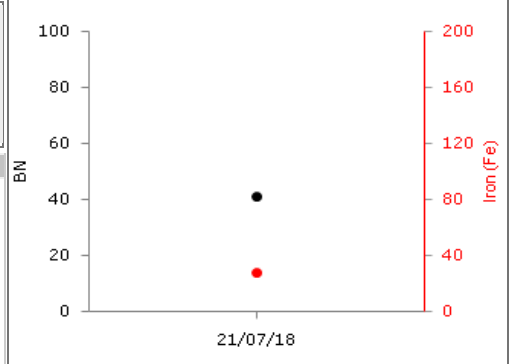
Manufacturer	: MAN B&W	Model	: 6S50MC-C
Port Landed	: Mozambique Port	Volume(ltr)	: 11000
Fuel Grade	:	Dispatched	: 03-Sep-18
Sampled By	: 2 / E	Received	: 09-Sep-18
Lubricant in Use	: TARO SPECIAL HT 70	Recommended	: TARO SPECIAL HT 70

Sample Details	1 (Current)	2	3
Rating	Normal		
Sample No	18074893		
Sampled Date	21-Jul-18		
Engine Hours	42747		
Liner Hours	42747		
Crown Hours	42747		
Piston Ring Hours	5916		
Feed Rate[g/kwh]	1.50		
Fuel,Sulphur[%wt]	3.50		
Sp. FR[g/kW/h/%wt]	0.43		
Load[%MCR]	55.90		
Rpm[min^{-1}]	108.50		

New Oil	OEM	System Oil	Analysis
70.0		Dark	Appearance Dark
21.0		14.8	BN[mgKOH/g] /(Corr) 41.1 /45.7
270		12.63	KV@100°C[mm^2/s] /(Corr) 18.01 /19.25
		>200	Flash Point[°C] >200
		<0.05	Water[%wt] 0.60
		0.20	Soot/Insoluble[%wt] 0.40
			Sys.Oil Dilution[%] 15
		16	PQ Index/2ml /(Corr) 18 /18

Wear Elements [ppm]			
1	Aluminium (Al)	5	
<1	Chromium (Cr)	2	
4	Copper (Cu)	4	
7	Iron (Fe) /(Corr)	28 /31	
1	Lead (Pb)	1	
1	Tin (Sn)	1	

Contaminant Elements [ppm]			
9	Sodium (Na)	24	
7	Silicon (Si)	28	
<1	Molybdenum (Mo)	1	
4	Nickel (Ni)	22	
<1	Silver (Ag)	<1	
14	Vanadium (V)	87	

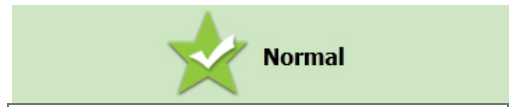


Oil Rating:
Remaining reserve of alkalinity in the oil is adequate. Contaminant elements Sodium, Aluminium and Silicon might be originated from the HFO. Vanadium and Nickel are HFO derived elements.

Unit Rating:
PQ and elemental Fe results suggest that the Iron level is within the acceptable limit.

Action:
No action required.

MAIN ENGINE [CYLINDERS] [Cylinder No 5]



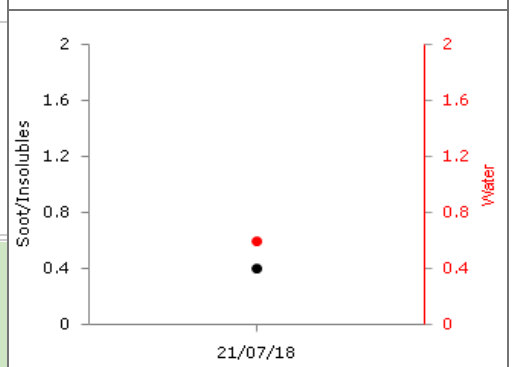
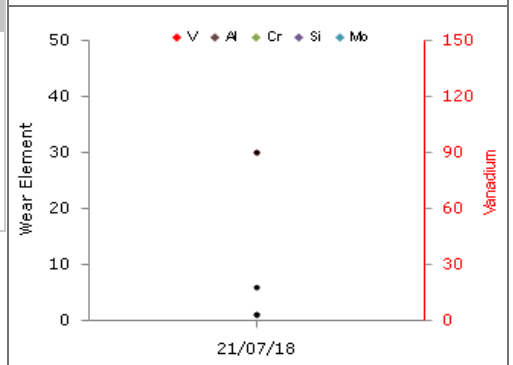
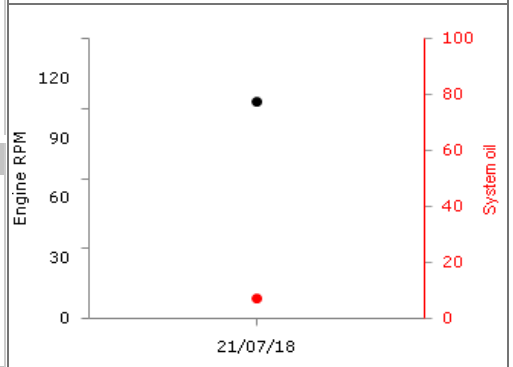
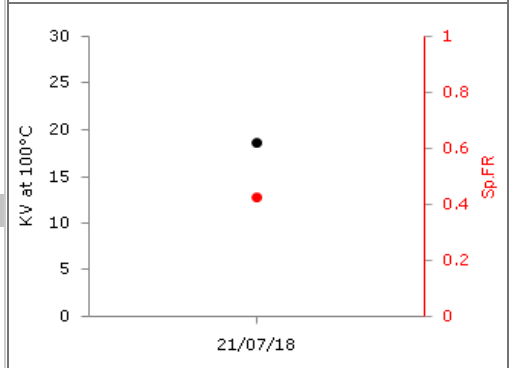
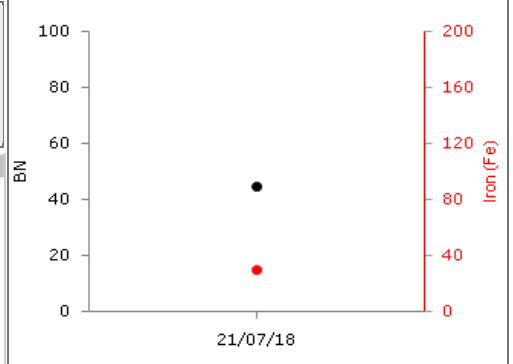
Manufacturer	: MAN B&W	Model	: 6S50MC-C
Port Landed	: Mozambique Port	Volume(ltr)	: 11000
Fuel Grade	:	Dispatched	: 03-Sep-18
Sampled By	: 2 / E	Received	: 09-Sep-18
Lubricant in Use	: TARO SPECIAL HT 70	Recommended	: TARO SPECIAL HT 70

Sample Details	1 (Current)	2	3
Rating	Normal		
Sample No	18074894		
Sampled Date	21-Jul-18		
Engine Hours	42747		
Liner Hours	42747		
Crown Hours	42747		
Piston Ring Hours	5916		
Feed Rate[g/kwh]	1.50		
Fuel,Sulphur[%wt]	3.50		
Sp. FR[g/kW/h/%wt]	0.43		
Load[%MCR]	55.90		
Rpm[min^{-1}]	108.50		

New Oil	OEM	System Oil	Analysis
70.0		Dark	Appearance Dark
21.0		14.8	BN[mgKOH/g] /(Corr) 44.4 /46.6
270		12.63	KV@100°C[mm^2/s] /(Corr) 18.63 /19.22
		>200	Flash Point[°C] >200
		<0.05	Water[%wt] 0.60
		0.20	Soot/Insoluble[%wt] 0.40
			Sys.Oil Dilution[%] 7
		16	PQ Index/2ml /(Corr) 19 /19

Wear Elements [ppm]			
1	Aluminium (Al)	6	
<1	Chromium (Cr)	1	
4	Copper (Cu)	4	
7	Iron (Fe) /(Corr)	30 /31	
1	Lead (Pb)	<1	
1	Tin (Sn)	1	

Contaminant Elements [ppm]			
9	Sodium (Na)	25	
7	Silicon (Si)	30	
<1	Molybdenum (Mo)	1	
4	Nickel (Ni)	23	
<1	Silver (Ag)	<1	
14	Vanadium (V)	90	

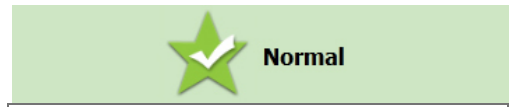


Oil Rating:
Remaining reserve of alkalinity in the oil is adequate. Contaminant elements Sodium, Aluminium and Silicon might be originated from the HFO. Vanadium and Nickel are HFO derived elements.

Unit Rating:
PQ and elemental Fe results suggest that the Iron level is within the acceptable limit.

Action:
No action required.

MAIN ENGINE [CYLINDERS] [Cylinder No 6]



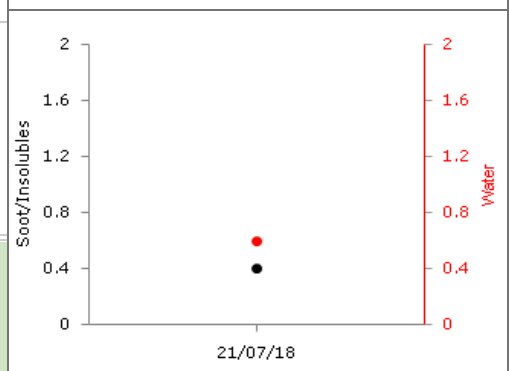
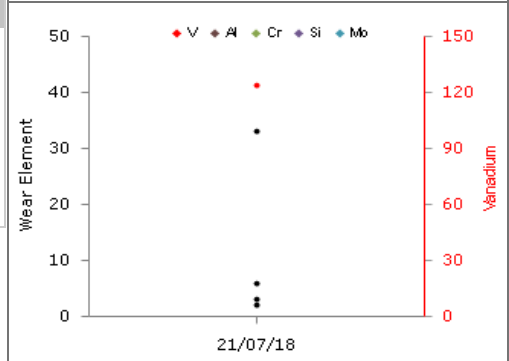
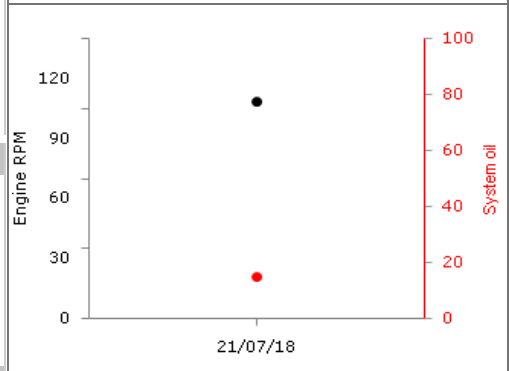
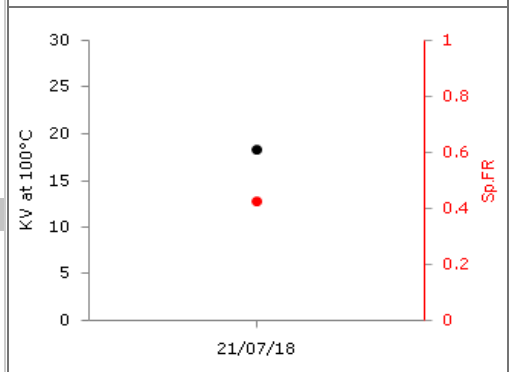
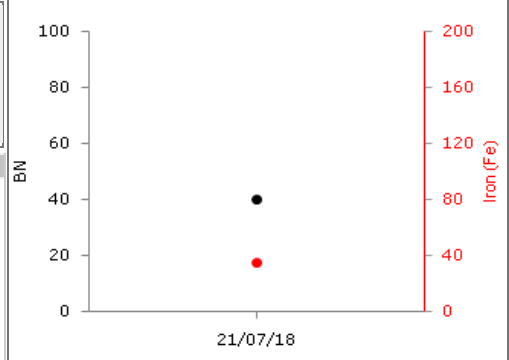
Manufacturer	: MAN B&W	Model	: 6S50MC-C
Port Landed	: Mozambique Port	Volume(ltr)	: 11000
Fuel Grade	:	Dispatched	: 03-Sep-18
Sampled By	: 2 / E	Received	: 09-Sep-18
Lubricant in Use	: TARO SPECIAL HT 70	Recommended	: TARO SPECIAL HT 70

Sample Details	1 (Current)	2	3
Rating	Normal		
Sample No	18074895		
Sampled Date	21-Jul-18		
Engine Hours	42747		
Liner Hours	42747		
Crown Hours	42747		
Piston Ring Hours	6481		
Feed Rate[g/kwh]	1.50		
Fuel,Sulphur[%wt]	3.50		
Sp. FR[g/kW/h/%wt]	0.43		
Load[%MCR]	55.90		
Rpm[min^{-1}]	108.50		

New Oil	OEM	System Oil	Analysis
70.0		Dark	Appearance Dark
21.0		14.8	BN[mgKOH/g] /(Corr) 39.9 /44.3
270		12.63	KV@100°C[mm^2/s] /(Corr) 18.25 /19.56
		>200	Flash Point[°C] >200
		<0.05	Water[%wt] 0.60
		0.20	Soot/Insoluble[%wt] 0.40
			Sys.Oil Dilution[%] 15
		16	PQ Index/2ml /(Corr) 21 /21

Wear Elements [ppm]			
1	Aluminium (Al)	6	
<1	Chromium (Cr)	3	
4	Copper (Cu)	15	
7	Iron (Fe) /(Corr)	35 /39	
1	Lead (Pb)	1	
1	Tin (Sn)	1	

Contaminant Elements [ppm]			
9	Sodium (Na)	30	
7	Silicon (Si)	33	
<1	Molybdenum (Mo)	2	
4	Nickel (Ni)	33	
<1	Silver (Ag)	<1	
14	Vanadium (V)	124	



Oil Rating:
Remaining reserve of alkalinity in the oil is adequate. Contaminant elements Sodium, Aluminium and Silicon might be originated from the HFO. Vanadium and Nickel are HFO derived elements.

Unit Rating:
PQ and elemental Fe results suggest that the Iron level is within the acceptable limit.

Action:
No action required.



Lubricant Analysis - Glossary

The service utilises the latest analytical techniques and computer programming to offer an advanced lubricant analysis package that provides a valuable lubricant monitoring tool for the ship operator.

Lubricant properties reported on lubricant analysis reports

(tests conducted depend on machinery type and oil grade)

Viscosity

A measure of the resistance of a liquid to flow. Commonly referred to as the 'thickness of an oil'.

Closed Flash Point

Primarily a test for fuel dilution in engine oils. A decrease in flash point is generally an indication of fuel ingress which has contaminated the lubricant.

Insolubles

A test for the total solids contamination in a lubricant such as combustion soot, dirt, oxidation products and metal wear debris.

Base Number

'Previously known as Total Base Number (TBN) is a measure of the reserve alkalinity of an engine oil and its ability to neutralise harmful acids.

Acid Number

Tests the acidity of the oil. Certain oils have an inherent acidity level related to their additive chemistry. Increasing acidity may be indicative of the presence of organic acids derived from oil oxidation.

Water

The percentage (by volume) of the total amount of water contamination.

PQ Index

Not an oil property but an indices that provides a quantitative assessment, for trending purposes, of the amount of ferrous wear debris in the sample.

Asphaltenes

Give an indication of heavy fuel derived components from raw fuel ingress and/or products of combustion from blow-by.

Elemental analysis with some typical sources

(elements reported depend on machinery type and oil grade and are reported in PPM - Parts Per Million)

Aluminium Pistons, bearings, housings, fuel derivative

Antimony Bearings

Calcium Lubricant derivative

Chromium Piston rings

Copper Bearings, gears, oil coolers, pipe-work, piston-rod glands

Iron Cylinder liners, crankshafts, piston rings, gears

Lead Bearings

Magnesium Casings, housings, lubricant derivative

Manganese Cylinder liners

Molybdenum Piston rings

Nickel Bearings, valves, gears, fuel derivative

Potassium Salt Water

Phosphorus Lubricant derivative

Silicon Dust, dirt, fuel derivative, lubricant derivative

Silver Bearings

Sodium Salt water, coolant derivative, fuel derivative

Tin Bearings

Vanadium Fuel derivative

Zinc Lubricant derivative

The information above is considered to be accurate as of the dates specified. We have reviewed this information; however, no warranty or representation, express or implied, is made as to the accuracy or completeness of the data and the information contained in this note.