



**A FUEL SOLUTIONS COMPANY**

# **INSTRUCTIONAL MANUAL**



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# INSTRUCTION SHEET

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## **KADAKS 20x50 HELPS AGAINST:**

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- *HIGH INSTABILITY  
AND  
INCOMAPATIBILITY*
  - *HIGH SLUDGE  
CONTAMINATION*
  - *HIGH ASPHALTENES*
  - *HIGH CARBON  
RESIDUES*
  - *HIGH CCAI VALUES*
  - *HIGH SEDIMENTS*
  - *HIGH VANADIUM*
- 
- 

### **USAGE INSTRUCTIONS:**

- **INITIAL DOSAGE: 1 LTR PER 25 TONS OF FUEL**
- **SUBSEQUENT DOSAGE: 1 LTR PER 50 TONS OF FUEL**

**Before bunkering (*Recommended*):** Pour KADAKS into the main fuel tanks or the double bottom tanks through feed-lines, sounding pipes or vent pipes.

**Before bunkering:** Pour KADAKS into the settling tank using either sounding or vent pipes. Follow by blowing air to aid circulation.



**WE RECOMMEND EVALUATING THE C.C.A.I VALUE BEFORE EACH BUNKERING AND ADJUSTING THE DOSAGE ACCORDINGLY TO ACHIEVE BEST RESULTS.**

SEE CHART BELOW FOR 4-STROKE ENGINES

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<b>C.C.A.I LEVEL</b>	<b>RECOMMENDED DOSAGE</b>
<b>&lt; 845</b>	<b>1 LTR PER 50 TONS</b>
<b>&lt;855</b>	<b>1 LTR PER 25 TONS</b>
<b>&gt;855</b>	<b>1 LTR PER 15 TONS</b>
<b>&gt;865</b>	<b>FUEL NOT RECOMMENDED</b>

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# PRODUCT SPECIFICATIONS

## PROPERTIES

Appearance:	Liquid
Color:	Dark Brown
Initial boiling point:	>262° C
Flash point (ASTM D 92):	139° C
Pour Point (ASTM D 92):	3° C
Specific Gravity:	0.99g/ml

Viscosity in cSt (ASTM D92)	
20°C	7650
40°C	850

pH	11.0
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Solubility in:	
Petroleum products	MISCIBLE
Water	INSOLUBLE

## DESCRIPTION

KADAKS 20x50 is an alkaline eco-friendly additive created specifically to reduce soot emissions, reduce scaling, separate asphaltenes, to homogenize the fuel, and to enhance atomization. It improves the overall combustion and efficiency of the fuel.

## DOSAGE

KADAKS fuel treatment dissolves readily in fuel. KADAKS should be poured into the main fuel tanks or double bottom tanks through the feed-line, sounding or vent pipes prior to bunkering. Under circumstances when tanks are already filled KADAKS can be poured in via sounding or vent pipes and dispersed by blowing air.

**DOSAGE: 1 LITER PER 50 TONS OF FUEL**

It is advised that the KADAKS fuel treatment is added in the concentration of one liter per twenty five tons of fuel for the initial treatment. Watch filters, separators and drain the tanks regularly during the first week.

## BLENDING

KADAKS fuel additives are miscible in petroleum and can be blended in batches for best results. It requires no special equipment for circulating and dispersing.

## FREIGHT CLASSIFICATION

Not regulated

EEC Label Required

IRRITANT (X)

## SHIPPING

Available only in 20 liter plastic buckets/pail

## CUSTOMS CLASSIFICATION

Harmonized Tariff System: 3811.900

## HANDLING

Handled according to same guidelines available for petroleum products.

- If skin contact occurs, wash affected areas with soap and water.
- If eye contact occurs, immediately wash with generous amounts of clean water or eyewash for at least ten minutes.

## STORAGE

KADAKS fuel treatment can be stored under extreme temperature conditions for prolonged periods without undergoing any chemical alteration.

# MATERIAL SAFETY DATA SHEET

## SECTION I: PRODUCT INFORMATION

<b>Product Name:</b> KADAKS 20x50
<b>Usage:</b> Fuel oil treatment
<b>Manufacturer:</b> KADAKS INC.
<b>Street Address:</b> 1702 MCKINLEY SUITE 10
<b>City:</b> HOLLYWOOD
<b>Postal code:</b> FL 33020
<b>Emergency telephone number:</b> (786) 565-7707

## SECTION II: HAZARDOUS INGREDIENTS

Hazardous ingredients	Concentration (%)	Registry number	LD50 (species and route)	LC50 (species)
POLYAMINE ALKYL AMIDE	60-100%	A/F-040313	N.A.	N.A.

WHMIS Class: D-2B

## SECTION III: PHYSICAL DATA

<b>Physical state:</b> Liquid	<b>Odor and appearance:</b> Dark brown liquid with strong smell	<b>Odor threshold:</b> N.A.	<b>Specific gravity:</b> 0.99g/ml
<b>Vapor pressure (mmHg):</b> N.A.	<b>Vapor Density:</b> Air=1 N.A.	<b>Evaporation Rate:</b> N.A.	<b>Boiling Point ( C°):</b> >262° C
<b>pH:</b> 11.0	<b>Pour point:</b> 3°C	<b>Water solubility (20 °C):</b> Insoluble	<b>Coefficient of water /oil distribution:</b> N.A.

## SECTION IV: FIRE OR EXPLOSION HAZARD

<b>Flash point and method:</b> ASTM D-92 139°C	<b>Upper flammable limit (% by vol.):</b> N.A.	<b>lower flammable limit (% by vol.):</b> N.A.
<b>Auto-ignition temperature:</b> N.A.	<b>TMD flammability class:</b> N.A.	<b>Hazardous combustion products:</b> CO <sub>x</sub> , NO <sub>x</sub> , products of incomplete combustion.
<b>Conditions of Flammability:</b> Not flammable		
<b>Means of extinction:</b> Dry chemical, carbon dioxide, water spray or foam.		
<b>Special Procedures:</b> do not spray the fire directly; a spray of water or foam directly on a hot liquid in combustion could make the liquid foamed.		
<b>Sensitivity to mechanical impact:</b> Not sensitive	<b>Sensitivity to static discharge:</b> Not sensitive	



## SECTION V: REACTIVITY DATA

<b>Chemical Stability:</b> Stable
<b>Incompatible substances:</b> Acids and strong oxidizing agents
<b>Conditions of reactivity:</b> Not Reactive
<b>Hazardous decomposition products:</b> No hazardous decomposition products are expected.
<b>Polymerization:</b> N.A.

## SECTION VI: TOXICOLOGICAL PROPERTIES

<b>Inhalation:</b> Effect of acute exposure to product: No data Effect of chronic exposure to product: No data	
<b>Skin absorption/contact:</b> Effect of acute exposure to product: Skin irritation Effect of chronic exposure to product: Prolonged and repeated may cause skin irritation and dermatitis	
<b>Ingestion:</b> Effect of acute exposure to product: No data Effect of chronic exposure to product: No data	
<b>Eye contact:</b> Effect of acute exposure to product: Causes irritation Effect of chronic exposure to product: Causes irritation	
<b>LD50 of product (calculated) (species and route):</b> Oral (rat): 10g/kg	
<b>LC50 of product (calculated)(species):</b>	
<b>Name of toxicological synergistic products:</b> N.A.	
<b>Carcinogenicity:</b> N.A.	<b>Teratogenicity:</b> N.A.
<b>Reproductive toxicity:</b> N.A.	<b>Mutagenicity:</b> N.A.

## SECTION VII: PREVENTION MEASURES

<b>Gloves:</b> Wear chemical resistant gloves to avoid skin contact with product
<b>Clothes:</b> Wear impervious clothing to protect against repeated or prolonged exposure
<b>Eyes Protection:</b> Wear safety glasses. Do not wear contact lenses.
<b>Ventilation:</b> Provide general exhaust ventilation to control contaminants levels below the exposures and guidelines.
<b>Emergency showers:</b> Emergency showers and eye wash should be readily accessible in the area where product is handled.
<b>Storage Requirements:</b> store in a cool and dry area.
<b>Special shipping information:</b> N.A.
<b>Spill and leak handling process:</b> <ul style="list-style-type: none"> <li>➤ Isolate hazard area and restrict access.</li> <li>➤ Avoid direct contact with material.</li> <li>➤ Stop leak only if safe to do so.</li> <li>➤ Absorb with absorbent material and place in containers for disposal.</li> </ul>
<b>Waste disposal:</b> Incinerate in accordance with federal, provincial and local regulations.



## SECTION VIII: FIRST AID MEASURES

**Inhalation:** Remove to fresh air. If breathing has stopped or is labored, give assisted respiration. Keep the victim warm and at rest. Call a physician.

**Skin contact:** Remove immediately contaminated clothing and shoes. Wash affected area with mild soap and water for at least 15 minutes (or until complete disappearance of chemical residue). Call a physician.

**Eye contact:** Immediately flush eyes with ample amounts of water for at least 15 minutes (or until complete disappearance of chemical residue). Call a physician.

**Ingestion:** Call a physician immediately.

## SECTION IX: PREPARATION OF MSDS

**Prepared by:** Andreas Krenzen

**Date:** November, 2012

**Phone number:** (786) 565-7707



# TEST RESULTS

SAMPLE INFORMATION
SAMPLE: KADAKS 20X50 Fuel Additive
TESTED BY: Viswa Lab, Inc. ADDRESS: 12140 Almeda Rd, Houston, Texas 77045, USA
DATE: September 3, 2012

	ORIGINAL DO SAMPLE	With 1: 25000	With 1:50000
<b>SERIAL</b>	4407	H120844669	H120844694
<b>GRADE</b>	MGO DMA LS	MGO DMA LA	MGO DMA LS
<b>DEN</b>	834.1	834.1	834.1
<b>APIGRAV</b>	38.06	38.06	39.06
<b>VIS40</b>	2.67	2.73	2.71
<b>UPP</b>	-9	-9	-9
<b>H2O</b>	0	0	0
<b>MCR</b>	0	0	0
<b>SUL</b>	0.06	0.07	0.06
<b>TSE</b>	0	0	0
<b>ASH</b>	0.003	0.003	0.003
<b>AL</b>	0.2	0.6	0.8
<b>V</b>	4.8	5.2	4.5
<b>NA</b>	0.7	0.6	1.0
<b>SI</b>	0.2	0.1	0.1
<b>MG</b>	0.3	0.4	0.8
<b>CA</b>	0.6	0.5	0.9
<b>P</b>	0.1	0.1	0.1
<b>FE</b>	5.0	4.5	5.1
<b>PB</b>	0.1	0.1	0.1
<b>NI</b>	0.9	1.0	1.1
<b>ZN</b>	0.1	0.1	0.1
<b>K</b>	0.1	0.1	0.1
<b>CAL</b>	43.2	43.2	43.2
<b>FP</b>	61	62	61
<b>VISUAL</b>	Clear and Bright	Clear and Bright	Clear and Bright



	ORIGINAL FO SAMPLE	With 1:25000	With 1:50000
<b>SERIAL</b>	4409	H120844670	H120844695
<b>GRADE</b>	IFO 380 RMG 380	IFO 380 RMG 380	IFO 380 RMG 380
<b>DEN</b>	991.5	991.5	991.5
<b>APIGRAV</b>	11.13	11.13	11.13
<b>VIS40</b>	383.36	383.36	383.36
<b>UPP</b>	12	15	12
<b>H2O</b>	0.1	0.1	0.1
<b>MCR</b>	17.55	17.5	17.5
<b>SUL</b>	3.13	3.11	3.12
<b>TSE</b>	0.03	0.03	0.03
<b>ASH</b>	0.04	0.04	0.04
<b>AL</b>	5.2	4.9	5.3
<b>V</b>	160.2	161.3	162.7
<b>NA</b>	19.2	17.9	18.6
<b>SI</b>	2.5	2.4	2.7
<b>MG</b>	0.4	0.4	0.4
<b>CA</b>	3.6	3.7	3.9
<b>P</b>	0.1	0.1	0.1
<b>FE</b>	24.2	25.0	24.6
<b>PB</b>	0.1	0.1	0.1
<b>NI</b>	33.5	33.9	32.1
<b>ZN</b>	0.8	0.8	0.8
<b>K</b>	0.1	0.1	0.1
<b>CAL</b>	40.1	40.1	40.1
<b>FP</b>	91	92	92
<b>CCAI</b>	852	852	852



# THE BENEFITS OF KADAKS 20x50 FUEL TREATMENT

Problem related to untreated fuel	Before KADAKS	After treatment with KADAKS
<b>Soot Deposit</b>	Extensive soot deposit on deck and funnel	Reduced soot deposit on deck and funnel. Visible improvements in funnel and deck condition
<b>Moisture Absorption</b>	Ethanol present in fuel increases the moisture absorption by the fuel	Reduced moisture absorption by the fuel
<b>Carbon Deposit</b>	Carbon deposit and buildup on deck and funnel	Reduced amount of carbon deposit on deck and funnel.
<b>Sludge</b>	Sludge in fuel tanks	Eliminated sludge
<b>Compatibility</b>	Fuel incompatibility	Prevented and cured fuel incompatibility
<b>Filters</b>	High level of buildup needs frequent cleaning	Reduced time between cleanings
<b>Homogenization</b>	Un-homogenized fuel oil	Homogenized fuel oil
<b>Asphaltenes</b>	Carbon precipitation	Reduced carbon precipitation
<b>Atomization</b>	Low atomization	Improved atomization



<b>Pistons</b>	Carbon deposit	Minimized carbon deposits in pistons
<b>Scavenge areas</b>	Exhaust Fouling	Reduced Fouling
<b>Stuffing boxes</b>	Exhaust fouling	Minimized exhaust fouling
<b>Exhaust valves</b>	Carbon fouling	Stopped carbon fouling
<b>Economizer</b>	Fouling	Minimized fouling



# EXPECTED BENEFITS OF KADAKS

## 20x50

<b>Before Combustion</b>	<b>During Combustion</b>	<b>After Combustion</b>
<ul style="list-style-type: none"><li>➤ Conditions the fuel oil</li><li>➤ Prevents fuel oil incompatibility and satisfaction</li><li>➤ Balances the pH by reducing acidity</li><li>➤ Kills bacteria, algae and fungal growths</li><li>➤ Breaks water emulsion</li><li>➤ Anti-foaming agent</li><li>➤ Extends time between purifier cleanings</li><li>➤ Extends time between filter cleanings</li><li>➤ Reduces sludge rejected</li><li>➤ Extends TBO of injection pumps</li></ul>	<ul style="list-style-type: none"><li>➤ Lengthens injectors' service life</li><li>➤ Improves atomization and combustion</li><li>➤ Stops vanadium corrosion of exhaust valves</li><li>➤ Saves fuel</li></ul>	<ul style="list-style-type: none"><li>➤ Reduces soot and other types of carbon deposit in the funnel</li><li>➤ Minimizes exhaust fouling</li><li>➤ Minimizes turbo-charger fouling</li><li>➤ Reduces sparks and carbon fallout's</li><li>➤ Reduces Smoke Emission</li></ul>



# A SOLUTION FOR FILTER PROBLEMS

## **THREE MAIN TYPES OF FILTER PROBLEMS:**

- Fuel delivered may have high concentration of suspended solids
- Fuel delivered may be incompatible with fuel already in tanks and result into precipitation of Asphaltenes. Causing high suspended solid concentrations
- Sludge accumulated over the years on the tank bottoms may be stirred up, dispersing sludge throughout the fuel

## **HOW KADAKS FUNCTIONS**

KADAKS is a petroleum soluble surfactant formulated specifically for heavy fuel oil and diesel oil. It produces a soapy effect that breaks down large agglomerations and disperses tiny particles equally throughout the mixture.

## **ANTI-SCREEN CLOGGING TEST**

A test designed by Mobil, known as the Mobil Method 530, evaluates the dispersant characteristics of fuel oil additives.

In this test, four liters of fuel containing 15g of synthetic sludge are circulated on a metal strainer by a fuel oil burner pump. Sludge retained by the strainer is transferred to a tarred gooch crucible and weighed.

Synthetic sludge is produced from:

1. 50% distilled water (by weight)



2. 40% uninhibited light fuel oil (by weight)
3. 10% carbon lamp black (by weight)

A closed container with mixture is placed in a mechanical shaker and agitated for five minutes at about 250 cycles per minute. The partially emulsified mixture is then run through a homogenizer until a stable sludge with a dense consistency is produced.

The test is duplicated with uninhibited fuel and with KADAKS-treated fuel. The results were calculated as follows.

$$\text{Rating} = (1-A/B)*100$$

**Rating:** percent screen deposit from fuel treated with KADAKS

**A:** weight in grams of deposit from fuel treated with KADAKS fuel-oil additive

**B:** weight in grams of uninhibited fuel deposit

## RESULTS

Rating exceeding 90% in fuel additives indicate high dispersant abilities.

Test no.	A (mg)	B (mg)	Rating %
1	1.04	177.5	99.4
2	2.98	165.7	98.2
3	1.94	175.8	98.9
<b>Average</b>	1.99	173.0	98.8



KADAKS high rating of 98.8% (see table above) makes it the best choice among dispersant additives for fuels.

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## **HISTORY AND BACKGROUND OF HEAVY FUEL OIL:**

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In the past, a refinery was a fraction distillation plant where the constituents of crude oil were only physically separated yielding approximately 40% residual output. This process is obsolete due to exponential increases in the crude oil prices over the past few years. One barrel of crude oil sells for approximately \$105 (USD) and roughly \$682.5 (USD) per ton in recent times. The current market value of heavy fuel oil (HFO) is approximately \$500 (USD) per ton. For every ton of HFO sold refiner bears an opportunity cost of \$182.5 (USD).

In present time, Crude oil is refined using visbreakers and/or thermal crackers. This process alters the chemical structure of hydrocarbons in the crude oil to yield low residual product output percentage.

As a side effect of changing the chemical structure, the volume of Asphaltenes in HFO composition has risen drastically from 4% to 15%. This presents a major problem to HFO users, the price of HFO continues to rise but the productivity is decreasing with increased presence of contaminants like asphaltenes.



## **ASPHALTENES**

### **“Cholesterol of Crude Oil”**

Asphaltenes are large polyaromatic molecules that exist in crude oils as monomers and micelles equilibrated to each other. The size of these molecules is quite large and falls in the colloidal range. These molecules have a tendency to precipitate, adhere to surfaces and cause pipe blockages. They are insoluble in aliphatic solvents (crude oil) and even when dissolved in aromatic solvents tend to form nano aggregates.

#### **What makes asphaltenes undesirable by HFO users?**

- No specific boiling or melting point
- Very large molecules
- High relative polarity tend to coagulate
- Form agglomerations that are physically bonded and cause fuel to not burn properly

**KADAKS reduces the size of agglomerations of asphaltenes in the HFO, to aid better combustion with a reduction in the unburned material.**

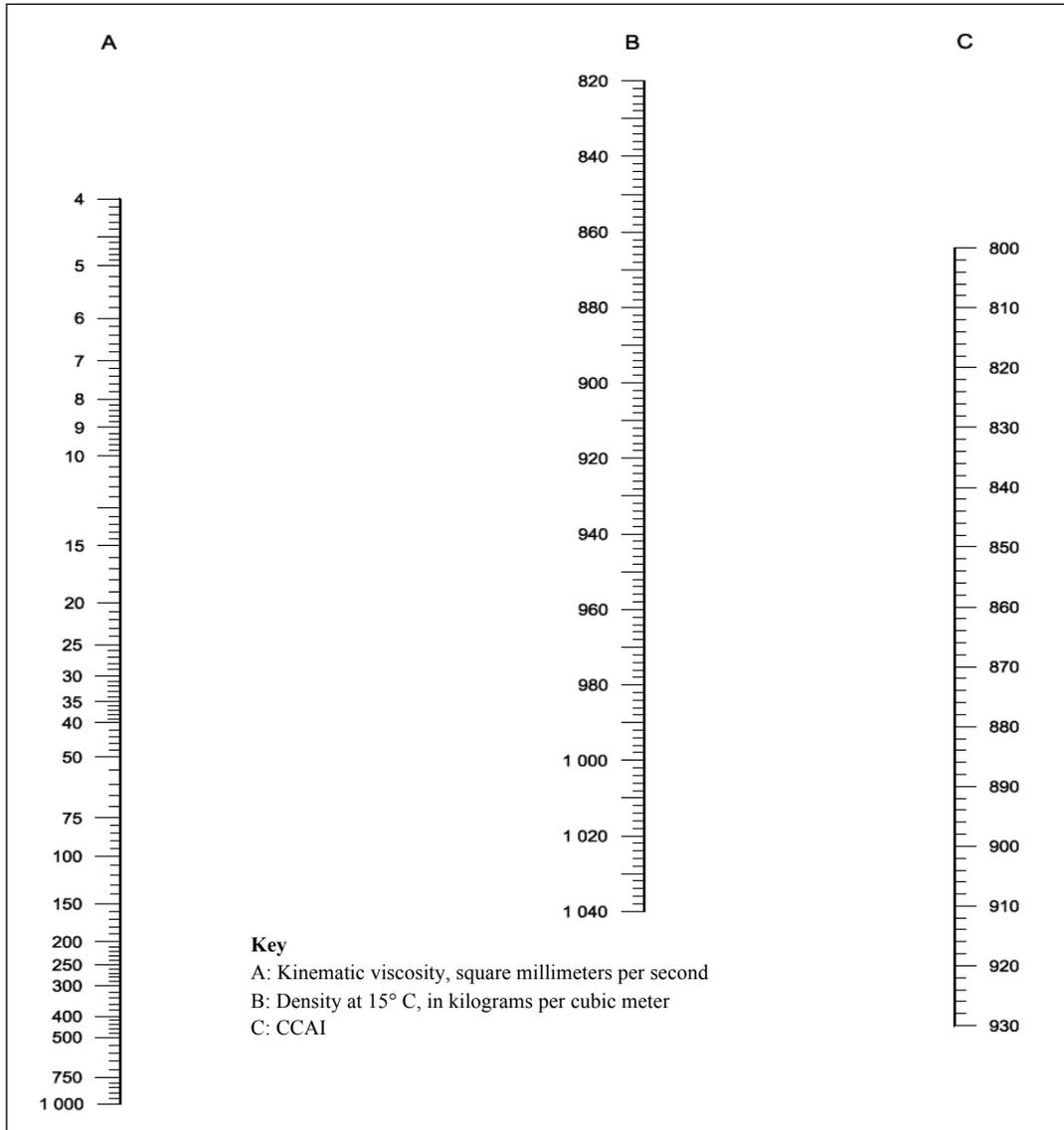


## **CCAI AND COMBUSTION**

Calculated Carbon Aromaticity Index (CCAI) can be used to measure from a nomogram how well a certain sample of fuel will burn. Two factors that determine a fuel's efficiency as a combustible are its viscosity and density.

Modern methods of refining crude oil involve processes that change fuel's chemical structure, as a side effect the CCAI in the HFO have increased in recent times. Crude oils are essentially aliphatic in nature but with modern refining methods, a small percentage of this fuel is transformed into aromatic structure. Aliphatic structures have higher hydrogen to carbon ratio than aromatic structures, which makes them suitable to be used as fuels. Aromatic structures take longer to ignite and produce less energy than aliphatic structures. Aromatic structures are highly polar in nature and tend to form agglomerations when in a solution that causes incomplete combustion.

## HOW TO CALCULATE CCAI?



**Figure 1:** Nomogram to evaluate CCAI



The monogram in figure 1 can be used to determine the CCAI, using the viscosity (measured in square millimeters/second at 50 Degree C) and density (measured in kg/m<sup>3</sup> at 15° C).

KADAKS offers the solution to improve the combustion without having to deal with the problems related with high viscosity fuels. KADAKS fuel solutions is a surfactant that breaks the agglomerations caused by aromatic structures and disperses them evenly throughout the fuel.

It reduces the ignition delay and incomplete combustion caused due to high CCAI in HFO.



# VISIT REPORT

DATE:

PORT:

THIS REPORT CONCERNS WHICH MAIN ENGINES:

AUX. ENGINE:

COMPANY:

VESSEL:

CHIEF ENG.:

ON BOARD SINCE:

ARE THEY USING A FUEL OIL ADDITIVE PRESENTLY:

ENGINE MAKE AND MODEL:

HOURS:

NO. OF CYLINDER:

ENGINE TORQUE:

RPM AT FULL LOAD FUEL VISCOSITY/DENSITY:

FUEL PREHEATING TEMPERATURE:

FUEL CONSUMPTION AT FULL SPEED (TONS PER DAY):

**TANKS**

**DOUBLE BOTTOM**

**SETTLING**

**DAY TANK**

DATE OF LAST INSPECTION:

DEPTH OF SLUDGE ON TANK:

BOTTOM:

mm

QUANTITY OF SLUDGE:

ON WALLS:

mm

ANY CORROSION PROBLEMS:

ANY HEATING LEAKAGE:



**FILTERS**

(BETWEEN MAIN TANK AND SETTLING TANK)

WHICH TYPE:

CLEANSING FREQUENCY: DAYS

% BLOCKED AT CLEANING TIME:

**FILTERS**

(BETWEEN SETTLING TANK AND DAILY TANK)

WHICH TYPE:

CLEANING: DAYS

% BLOCKED AT CLEANING TIME:

**SEPARATORS**

**PURIFIER**

MAKE AND MODEL:

IS IT AN AUTOMATIC TYPE : YES/NO

AUTOMATIC CLEANING FREQUENCY:

MINUTES

MANUAL CLEANING:

DAYS

DESCRIBE THE DISC STACK:

CONDITION BEFORE MANUAL CLEANING:

PURIFICATION TEMPERATURE:

°C

SLUDGE PRODUCTION :

%

**ENGINE**

ANY FOULING PROBLEM OF THE PREHEATER?

ANY FUEL FLOW METER?: MT/D

**INJECTION PUMP**

TIME BETWEEN OVERHAULING:

ANY SEIZURES (HOW MANY AND HOW OFTEN):

HOURS

ANY VERNISH FORMATION ON PLUNGERS:

IS THEIR OPERATION SATISFACTORY:

**INJECTORS**

FUEL RACK PRESSURE:

BAR

FUEL TEMPERATURE VISCOSITY/RAIL:

°C

MAIN ENGINE FUEL OIL PRESSURE:

BAR

ANY STICKING NEEDLES (FREQUENCY):



MAINTENANCE:

HOURS

AT THAT TIME DO THEY HAVE ANY

- TRUMPETS (WHAT SIZE):
- BLOCKED HOLES:
- WHAT % ARE LEAKING:

**COMBUSTION CHAMBER**

LUBE OIL BEARING AND PISTON PRESSURE: BAR

CYLINDER LUBE OIL PRESSURE: BAR

LUBE OIL PRESSURE TO THE X-CROSS-HEAD AND PISTON: BAR

ANY BROKEN RINGS (HOW MANY AND HOW OFTEN):

ANY EXCESSIVE WEAR OF

- CYLINDER LINERS:
- PISTON RINGS:
- PISTON RING GROOVES:

ARE RINGS FREE IN THEIR GROOVES:

DESCRIBE PISTON CROWN CONDITION:

EXHAUST TEMPERATURE FROM M.E CYLINDERS:

DATE:

cyl8	cyl7	cyl6	cyl5	cyl4	cyl3	cyl2	cyl1
°C							

**SCAVENGE AREAS**

SCAVENGE AIR PRESSURE: BAR

SCAVENGE AIR TEMPERATURE: °C

SCAVENGE PORT CONDITION:

**STUFFING BOXES**

STUFFING BOXES CONDITION: HOURS

INLET AIR FLAPS GRIDS CONDITION:

CLEANING FREQUENCY:

**EXHAUST VALVES**

TYPE OF VALVES:

FREQUENCY OF INSPECTIONS: HOURS

ARE THEY GROUND OR SANDED AT TIME OF INSPECTION:



HOW OFTEN ARE THEY CHANGED: HOURS  
ANY HIGH TEMPERATURE CORROSION OR VANADIUM DEPOSIT:  
ANY BURNT OR BROKEN (HOW MANY AND HOW OFTEN):

**EXHAUST MANIFOLD**

EXHAUST MANIFOLD CONDITION:  
EXHAUST GRINDS CONDITIONS:

**TURBO-CHARGER**

MODEL:  
FWD T/C TEMPERATURE: °C  
AWD T/C TEMPERATURE: °C  
FWD T/C RPM: RPM  
AWD T/C RPM: RPM  
FREQUENCY OF ROUTINE CLEANING: HOURS  
AFTER HOW MANY HOURS DO YOU OPEN: HOURS  
AT THAT TIME ANY DEPOSITS OR CORROSION VISIBLE:  
ANY DRY OR WATER CLEANING: MINUTES

**WASTE HEAT BOILER**

EXHAUST GAS BOILER IN/OUT TEMPERATURE: °C  
EXHAUST GAS DIFFERENTIAL PRESSURE: mmh<sub>2</sub>o  
SOOT BLOWING A DAY: X DAY  
CLEANING FREQUENCY: HOURS  
ANY DEPOSITS PRESENT: mm  
HOW MUCH:  
ARE DEPOSITS DIFFICULT TO REMOVE:  
ANY HIGH TEMPERATURE CORROSION:  
ANY ECONOMISER FIRE:



**FUNNEL**

ANY ABNORMAL SMOKE:

ANY CARBON FALLOUTS:

ANY SPARKS:

**ADDITIONAL REMARKS:**

**ANY PROBLEMS WITH AUX. BOILER OR AUX. ENGINES?**