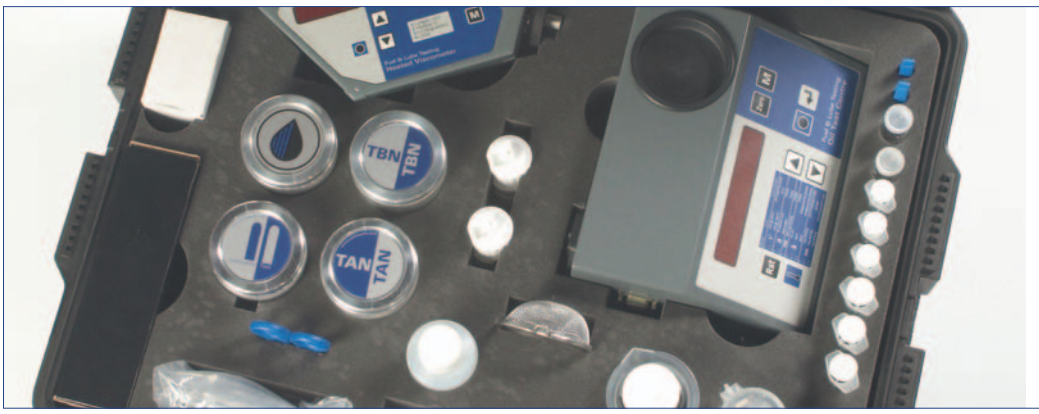
KITTIWAKE
monitoring innovation



Oil Analysis Solutions

High Specification, Exact Results.

Fuel and Lube Oil Analysis Made Easy.

Non-Hazardous for shipping water in oil test available where you see the Easy**SHIP** logo

EasySHIP

Make fast on-site maintenance decisions with Kittiwake's oil analysis solutions. An accurate range, providing laboratory grade oil condition results in minutes.

The Kittiwake oil analysis range provides a condition monitoring tool that enables you to make informed operational and maintenance decisions about your critical plant and equipment. Fuel and lubricating oils form a major cost element in the operation of almost all industrial machinery and engines; the quality must be closely monitored to protect the investment. The ability to test on-site, at the point of use, enables engineers and facilities managers to conduct oil analysis quickly and easily. Detecting out-of-spec fuels or lubricants can identify potential problems before equipment damage occurs. Choose from a range of equipment and parameters to use individually or combine into a single Oil Analysis Suite.

Protect your assets, improve productivity & increase uptime using regular on-site oil analysis

On-site Oil Analysis Laboratories

Kittiwake supply two styles of On-site Oil Analysis Suite. Oil Test centres come in metal or industrial roller cases for portability, while Fuel and Lube test cabinets are designed for wall mounting on-site. Of rugged design and suitable for long term use in harsh environments, the equipment is simple to use and ideal for operation by non-technical personnel.

- Fast accurate results for multiple oil parameters.
- Make informed on-site maintenance decisions.
- Act before the onset of critical failure.
- Robust and reliable in harsh or remote environments.

The Kittiwake Heated Viscometer and Test Console feature easy to use touch pad keys for simple operation, with results clearly displayed on an LCD screens

All equipment is securely stored in a robust portable roller case, ideal for long term use in harsh industrial environments

Like all Kittiwake equipment, the Oil Test Centre is manufactured under strict ISO 9001:2000 quality standards, ensuring consistent and accurate test results

Test cells for water in oil, insolubles and total base number (TBN), work in conjunction with the test console, via an electromagnetic link, eliminating the need for wires or batteries

Storage space for all consumables and reagents within the cabinet ensuring that all necessary equipment is readily available and easy to find

Replacement reagents and spare equipment, including a range of sample bottles and sampling equipment, are available from Kittiwake at short notice

Cloud Point Detector

When ambient temperature drops below a certain level, wax crystals can form in the oil. This temperature is the 'cloud point'.

Kittiwake's Cloud Point Detector measures the temperature at which these wax crystals form, helping to screen the oil and prevent potential problems such as blocked fuel filters and lines.

- Prevent wax crystals forming in the fuel, which can block filters and starve the engine.
- Particularly useful for any industry operating in climates with low ambient temperatures.
- Highly accurate, electronic instrument available in extended and standard temperature ranges.

Ordering Information

FG-K12663-KW:	**Cloud Point Detector (Standard)**
FG-K16954-KW:	**Cloud Point Detector (Extended Range)**
Range (standard):	-5°C to +20°C Diesel
Range (extended):	User selectable: +25°C to + 0°C, +15°C to -10°C, +5°C to -18°C
Sample size:	0.5 ml
Average test time:	< 8 minutes
Keypad:	Membrane type with tactile buttons
Display:	124 x 64 graphics LCD with LED backlight
Power:	100 - 250 VAC 50 / 60 Hz

Ordering Information

FG-K16909-KW: Electronic Flashpoint Tester

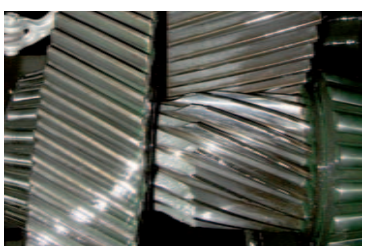
Temp Range:	0 to 300°C
Test Time:	1 to 99 minutes
Sample Size:	2 to 4 ml

Flash Point Tester

An automated closed cup instrument using a small sample size and 1 or 2 minute standard test time.

The flammability of a material determines its safety classification and the regulations under which it must be handled, stored and transported. Can also be used to help detect fuel dilution. Note: A standard butane (lighter) refill cartridge is required for operation.

ANALEX Machinery Condition Instrumentsn



The Kittiwake range of ANALEX wear debris analysis instruments, enable you to carry out simple, on-site oil and machinery condition monitoring.

Testing your oil for wear debris places you in complete control, enabling you to identifies wear trends and ensures expensive machinery and equipment failures are avoided. Problem equipment can be quickly identified, decreasing downtime, increasing productivity and profit.

Ordering Information

FG-K17144-KW: ANALEXfdMplus

Measurement Range: ppm	50 ml Bottle 0 - 2500 ppm 10 ml syringe 0 - 1900 ppm 5 ml Syringe 0 - 34000 ppm 5 ml Tube 0 - 28000 ppm Grease Pot 0 - 8000 ppm
Display Resolution	1 ppm or 2% of average reading, (whichever is greater)
Test Time:	< 1 minute to stabilise from power on < 15 seconds per sample
Power:	110 - 250 VAC auto-selected, 50 / 60 Hz

ANALEXfdMplus Ferrous Debris Meter

The ANALEXfdMplus is a highly accurate instrument designed to measure the level of ferrous wear debris in an oil or grease sample.

Reporting in parts per million, the unit can be used to measure ferrous wear debris in oil or grease in many sample vessels from a variety of machinery types.

- Rapidly identify wear rates; before damage occurs.
- Sophisticated Reporting - results shown in tabular display and graphical trending by equipment number. Alarms levels can be set and results downloaded to PC.
- Fully portable - robust and reliable in harsh or remote environments.

Fuel Oil Analysis Equipment

Gain peace of mind and ensure your fuel delivery is the correct specification.

Use Kittiwake fuel analysis equipment to check the key parameters of your fuel oil delivery. Kittiwake's rapid, independent and accurate fuel testing equipment confirms that your fuel oil is of acceptable quality and compatible with existing stocks.

- Range of equipment available to test for key parameters.
- Highly accurate, laboratory grade results available on-board or in the field.

Ordering Information

FG-K1-300-KW: Density Meter

Calculations: Density at 15°C in vacuo, Centipoise to centiStokes Calculated Carbon Aromaticity Index (CCAI)

The Density Meter is supplied complete with three hydrometers and consumables. The Density Meter is available standalone or as part of an Oil Analysis Suite.

Spare Hydrometers:
AS-K3-014
AS-K3-015
AS-K3-016

Density Meter

The Kittiwake Density Meter is suitable for both distillate and residual fuel oils.

Measuring the density of fuel using hydrometers, the Density Meter can be used to confirm the quantity and grade of fuel delivered.

Density Meter

- Ensure the correct weight of fuel has been delivered.
- Density is calculated electronically, giving fast, accurate results and estimating the combustion performance (CCAI), and correct viscosity in cP to cSt.

Compatibility Tester

Compatibility Tester

Ensure stability and compatibility of fuel types in minutes.

The compatibility tester will quickly identify potential fuel stability problems. It will also rapidly determine if a fuel is compatible with existing fuel stocks.

Ordering Information

FG-K1-500-KW: Compatibility Tester

The Compatibility Tester is supplied complete with test papers and consumables. The compatibility tester is available standalone or as part of an Oil Analysis Suite.

- Identify possible stability problems before mixing fuels, giving you peace of mind when accepting fuel deliveries.
- Prevent sludge deposits, failure of fuel handling systems and costly combustion related engine damage.

Configurations

EasySHIP Oil Test Centre Configurations (supplied in portable roller case)

Application	Order Number	Test Console	0-0.1%* 0-2.5% Water Cell	0-6000 ppm Water Cell	5-50 TBN Cell	0-6 TAN Cell	0-3 TAN Cell	Insolubles Test Cell	Unheated Viscometer	Heated Viscometer
Diesel Engines	FG-K4-120-KW-A	■	■		■			■	■	
	FG-K4-120-KW-A-H	■	■		■			■		■
Steam turbines, gear boxes & compressors Aviation lubes and hydraulics	FG-K4-120-KW-B	■	■			■			■	
	FG-K4-120-KW-B-H	■	■			■				■
	FG-K4-120-KW-C	■		■		■		■	■	
	FG-K4-120-KW-C-H	■		■		■		■		■
	FG-K4-120-KW-D	■		■			■		■	
Other configurations available	FG-K4-120-KW-D-H	■		■			■			■
	FG-K4-120-KW-E	■		■	■		■	■	■	
	FG-K4-120-KW-E-H	■		■	■		■	■		■
	FG-K4-120-KW-F	■		■	■			■	■	
	FG-K4-120-KW-F-H	■		■	■			■		■

* EasySHIP Water in Oil range 0-1.0% - non EasySHIP version 0-2.5%
For Oil Test centre configurations in portable roller case with non EasySHIP reagents - Part code FG-K1-120-KW-X(X)
Oil Test centre configurations are also available in marine NATO approved metal case. Part code FG-K4-100-KW-X(X) for EasySHIP & FG-K1-100-KW-X(X) for non EasySHIP

Fuel and Lube Test Cabinet Configurations

Application	Order Number	DIGI Water/ TBN Cell	0-2.5% Water Cell & Console	TAN 0-6 Cell	Insolubles Cell	Density Meter	Compatibility Meter	Heated Viscometer	Salt Test	Pour Point	Fuel Sampler
Marine Fuel & Lube	FG-K1-400-KW	■			ECON	■		■	■	■	
Steam Power Plant	FG-K1-602-KW		■	■		■	■	■	■	■	■

Specifications

Test	Range	Correlation	Accuracy	Test Time	Power	Application
Water in Oil Test Cell	0-2.5% (0-1.0% EasySHIP) 0-6000 ppm 0-3000 ppm	IP 386 ASTM D4928	+/- 0.1% +/- 100 ppm +/- 50 ppm	3 minutes 10 minutes	110 - 250 VAC	Fuel / Lube Oils
TBN Test Cell	0-99 mg/KOH	IP 400	+/- 5% <5 TBN + 1TBN	2.5 minutes	110 - 250 VAC	Lube Oils
Insolubles Test Cell	0-3.5% w/w 0-1.75%	IP 316 Mobil Soot Index	+/-0.1 w/w	1 minute	110 - 250 VAC	Lube Oils
TAN Test Cell	0-6 mg KOH TAN 0-6 mg KOH TAN IP139 0-3 mg KOH TAN IP177	IP 177 (ASTM D664) SAE ARP 5088 (modified IP139, ASTM D974)	+/-0.2 TAN	2 minutes	110 - 250 VAC	Fuel / Lube Oils
Density Meter	800-1010 kg/m^3 at 15°C Temp. selectable (50 or 70 °C)	ASTM D1298 / IP160	+/- 0.1%	1 - 10 minutes	110 - 250 VAC	Fuel Oils
Compatibility Meter	As per ASTM D4740	ASTM D4740	Variation of 1 rating in 20 repeat tests	20 minutes unattended	110 - 250 VAC	Residual
Viscosity (heated)	20-810 cSt at 40 °C, 50 °C or 100 °C	ASTM D445 / IP71	+/- 3 % (20 - 450 cSt) or +/- 2 cSt	1 - 10 minutes	110 - 240 VAC	Fuel Oil Fuel / Lube Oils
Viscosity (unheated)	15-500 cSt at 40 °C, 50 °C or 100 °C	ASTM D445 / IP71	+/- 2% (15 - 320 cSt) or +/ - 2 cSt	1 minute	110 to 250 VAC	Fuel / Lube Oils
Salt/Fresh Water	Go/no-go		Pass / Fail	1 hour	-	Fuel / Lube Oils
Pour Point	0-50 °C fuel oils ISO 8217 grade RMA-RMK	ASTM D97 / IP15	+/- 6 °C	10 minutes	-	Fuel Oils

Fuel and Lube Oil Analysis Equipment

Kittiwake fuel and lubricating oil analysis equipment enables you to carry out a simple on-site condition based maintenance of your fuel and lubricating oils.

- Regular monitoring to provide trends, helps to avoid expensive machinery and equipment failure.
- Laboratory grade results, available on-board or in the field, instantly.
- Save time and money by knowing exactly when to change out oil.

Specifications

Display:	8 digit LED
Keypad:	Membrane type with tactile buttons
Interfaces:	Measuring Cell socket with inductive power circuit and Infra Red data link. Infrared data link for viscometer. RS232 port for data down load to PC.
Memory:	Capacity to store 256 readings in non volatile storage
Power:	110 to 240 AC 50/60 Hz 20 VA

Console

Console

The console is the central control unit for the Oil Analysis range.

A unique inductive coupled power supply enables individual test cells to be powered via an electromagnetic link, thus eliminating the need for wires, batteries or connectors.

An infra-red data link connects the Unheated Viscometer to the side of the Console. Measurement data is transmitted via the link and up to 256 sets of readings can be stored in the memory. Results are displayed on an easy to read LCD screen and can be downloaded to a PC for further analysis and trending. The console features large key pad buttons for simple operation.

Water in Oil

Water can enter the oil from many sources including condensation, leakage and malfunction of oil treatment systems.

- Prevent corrosion and cavitation of machinery by detecting water in oil, before any damage occurs.
- Minimise instability of additive packages and damaging microbe growth by monitoring your oil.
- Two types of water in oil test cells are available, measuring 0-2.5 % range and 0-6000 ppm or 0-3000 ppm range. EasySHIP Easyship water in oil range 0-1%

Ordering Information

FG-K17767-KW EasySHIP **Water in oil 0-6000ppm**
FG-K17766-KW EasySHIP **Water in oil 0-1%**

Nato Stock No: 6630-99-024-7089
Test Kits contain Water in Oil Test Cell, Electronic Console and all reagents / consumables in a portable, robust metal case. Test Cells are also available as part of an Oil Analysis Suite.

Test Cells

Total Base Number (TBN)

The TBN of oil is the measure of the alkaline reserve, which is the ability of the oil to neutralise acids formed during the combustion process.

By determining the reference value of the new oil, the used oil TBN can be calculated.

- Avoid fouling within the engine and corrosion of engine components by monitoring the Total Base Number (TBN) of lubricating oils.

Ordering Information

FG-K25197-KW: TBN Test Kit

Nato Stock No: 6630-99-702-4865
Test Kit contains TBN Test Cell, Electronic Console and all reagents / consumables in a portable, robust metal case. The TBN Test Cell is also available as part of an Oil Analysis Suite.

Insolubles

Insolubles are a build up of combustion related debris and oxidation products within the oil.

- Regular monitoring of insolubles helps to prevent lacquer formation on hot surfaces, sticking of piston rings and wear of cylinder liner and bearing surfaces.
- Highly accurate results - two test modes are available; % insolubles w/w by IP316 or % insolubles by Mobil Soot Index.

Ordering Information

FG-K25194-KW: Insolubles Test Kit

Nato Stock No: 6630-99-811-8517

Test Kit contains Insolubles Test Cell, Electronic Console and all reagents / consumables in a portable, robust metal case. The Insolubles Test Cell is also available as part of an Oil Analysis Suite.

Ordering Information

FG-K25196-KW: Total Acid Number (TAN) Test Kit

Test Kit contains TAN Test Cell, Electronic Console and all reagents / consumables in a portable, robust metal case. The TAN Test Cell is also available as part of an Oil Testing Suite.

Total Acid Number (TAN)

Total Acid Number or TAN is a measure of both the weak organic and strong inorganic acids present within oil.

- Prevent damage from oil oxidation by monitoring TAN levels.
- Highly accurate test results with seperate reagent packs for 0-3 and 0-6 TAN.

Viscosity

Viscosity is regarded an oils most important characteristic. It is the viscosity that shows the oil's resistance to flow and the strength of the oil film between surfaces.

Viscosity can increase or decrease as a result of problems such as contamination, fuel dilution and shear thinning. Measurement of viscosity is extremely important for hydraulic oils, diesel engine oils, gears and fuel oils.

Two types of Viscometer are available from Kittiwake - Heated and Unheated. The heated viscometer measures at the actual temperature required while the unheated viscometer measures at room temperature and then automatically corrects to the reported temperature.

Both instruments are designed to 'Tilt' from side to side in both directions, allowing the ball to fall under gravity and the viscosity of the oil calculated automatically.

- Monitoring viscosity gives an early warning for a range of common problems.
- Highly accurate results with two readings are available at 40°C, 50°C or 100°C.
- Calculate the SAE range, as well as viscosity (unheated viscometer).
- Test an even greater range of oils, by changing the viscosity index or density.
- Estimate the combustion performance (CCAI) of fuel oil.
- Heavy duty, robust equipment - ideal for long term use with rapid results.

Ordering Information

FG-K1-200-KW: Heated Viscometer

Range:	Calculated Viscosity at 40 °C, 50°C and 100 °C, Calculated Carbon Aromaticity Index (CCAI).
Display:	8 Digit LED
Keypad:	Membrane type with tactile buttons
Power:	110 to 240 AC 50/60 Hz

Test Kit contains Heated Viscometer, power supply and all consumables in a portable robust metal case.

Unheated Viscometer

Range:	20-500 cSt Calculated Viscosity at 40 °C, 50°C and 100 °C. Calculated SAE Range

* Unheated Viscometer available as part of Oil Analysis Suite only

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