

Sampling Solutions



Fuel and Lube Oil Sampling Equipment.
Convenient, Representative, Approved.



Oil Samples are used to obtain a clear indication of the operating status of your machinery. One of the most important aspects of any oil analysis program is the sampling methods and equipment used. Often these are weak links that quickly compromise the program.

Obtaining a representative oil sample is one of the most important factors of a scheduled oil analysis program. Representative, uncontaminated oil samples are required for both regulatory and commercial purposes. A high standard oil sample will contain an accurate representation of the contaminants, additives, oxidation, particulates and wear condition of plant and equipment. If a sample does not represent the true condition of the oil and component at the time of sampling, the reliability of both the test result and its interpretation is affected.

Kittiwake's sampling solutions provide you with everything you need to easily gather an uncontaminated, representative sample of your fuel or lubricating oil, whenever your oil analysis program requires it.



Protect your machinery from potentially critical problems, with regular monitoring of your oil condition.

Fuel Oil Sampling



Fuel oil sampling is an essential element of any bunkering operation.

Representative fuel oil samples are required for both regulatory and commercial purposes. Crucial aspects of the sampling process include taking the sample, the sampling location and witnessing the process.

The importance of a suitably drawn and witnessed representative fuel oil sample cannot be over-emphasised. It forms the basis of all discussion, debate or dispute resolution relating to the bunkering.

Drip Type Bunker Samplers

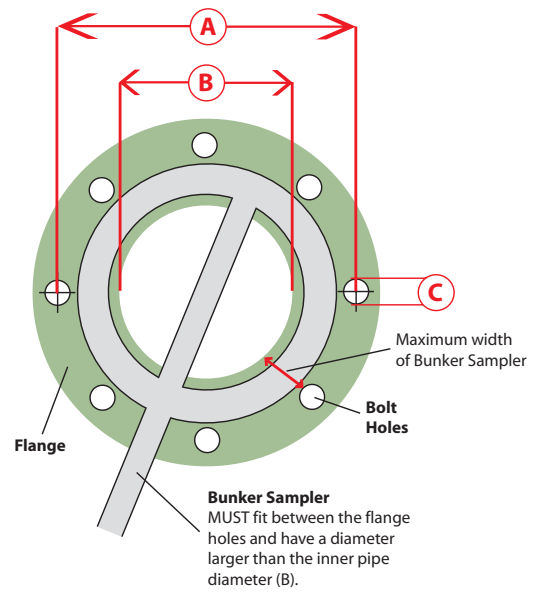
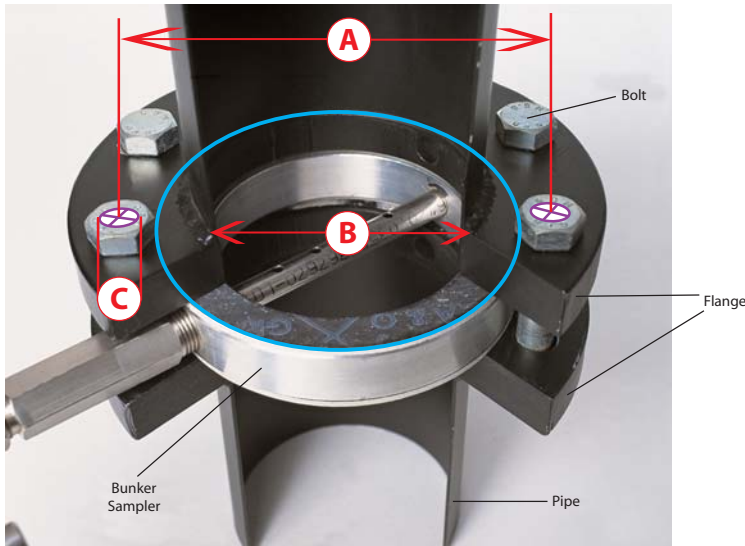
The most common and economic means of obtaining a representative sample is by using a drip type Bunker Sampler. In back to back tests performed by a major fuel testing laboratory over an extended period, samples obtained by drip samplers were identical to those from more expensive automatic fuel samplers.

- Lloyds Register approved and manufactured under strict ISO 9001:2000 quality assurance standards.
- IMO MARPOL 73/78 Annex VI compliant - helps you stay within the legal requirements for bunker sampling.
- Lightweight and very easy to install - obtaining a representative sample is quick and easy.
- Bunker Sampler Joint Rings included - all the equipment you need for correct installation.
- Even ex-stock bunker sampler sizes available from Kittiwake's extensive range of equipment.



Material:	Stainless Steel 304/316
Nominal Flange Thickness:	25 / 26 mm
Total Thickness: (including gaskets)	31 / 32 mm

Selecting the Correct Size of Drip Type Bunker Sampler



A = Pitch Circle Diameter

B = Nominal Pipe Size

C = Bolt Hole Diameter

Calculation

Pitch Circle Diameter (A) - Bolt Hole Diameter (C) = X

Select the nearest size Bunker Sampler with an outer diameter **smaller** than X and an inner diameter **larger** than the Nominal Pipe Size (B).

Example

Pitch Circle Diameter (A) = 290 mm

Bolt Hole Diameter (C) = 23 mm

Nominal Pipe Size (B) = 200 mm

290 (A) - 23 (C) = 267 (X)

Therefore the correct Bunker Sampler would be FG-K1-128-KW (8" Bunker Sampler), which has an outer diameter of 266 mm and an inner diameter of 221 mm. The outer diameter is smaller than X (the space between the flange bolts), yet the inner diameter is larger than the nominal pipe size (B), so that fuel flow is not impeded.

Sampler Sizes

Part Number	Nominal Pipe Size (B)	Inner Diameter	Outer Diameter	Weight	Flange Standard Correlations
FG-K1-122-KW	50 mm / 2"	63 mm	95 mm	3.40 kg	JISB2210 5K, 10K, 16K, BS 4504 PN10, PN16, BS10 D, E, F, ANSI B16.5 150, 300
FG-K1-123-KW	75 mm / 3"	86 mm	127 mm	3.90 kg	JISB2210 5K, 10K, 16K, BS 4504 PN16, BS10 D, E, F, ANSI B16.5 150, 300
FG-K1-124-KW	100 mm / 4"	116 mm	157 mm	4.28 kg	BS 4504 PN16, BS10 D, E, F, ANSI B16.5 150, 300
FG-K1-125-KW	125 mm / 5"	144 mm	188 mm	4.84 kg	JISB2210 5K, 10K, 16K, BS 4504 PN16, BS10 D, E, ANSI B16.5 150
FG-K1-126-KW	150 mm / 6"	171 mm	216 mm	5.46 kg	JISB2210 5K, 10K, 16K, BS 4504 PN16, BS10 D, E, F, ANSI B16.5 150, 300
FG-K1-127-KW	175 mm / 7"	194 mm	241 mm	6.16 kg	JISB2210 5K, 10K
FG-K1-128-KW	200 mm / 8"	221 mm	266 mm	6.48 kg	JISB2210 5K, 10K, 16K, BS 4504 PN10, PN16, BS10 D, E, F, ANSI B16.5 150
FG-K1-129-KW	225 mm / 9"	260 mm	307 mm	6.64 kg	ANSI B16.5 300
FG-K1-130-KW	250 mm / 10"	281 mm	328 mm	7.08 kg	JISB2210 10K, 16K, BS 4504 PN10, PN16, BS10 D, E, F, ANSI B16.5 150, 300
FG-K1-131-KW	275 mm / 11"	319 mm	361 mm	7.2 kg	JISB2210 10K, BS 4504 PN10, PN16, BS10 D, E
FG-K1-132-KW	300 mm / 12"	340 mm	401 mm	7.5 kg	JISB2210 16K, BS10 F, ANSI B16.5 150, 300
FG-K1-133-KW	350 mm / 14"	375 mm	420 mm	7.96 kg	BS 4504 PN10, PN16, BS10 D, E, F, ANSI B16.5 150, 300

Bunker Sampler Storage System (FG-K16091-KW)



Certified by Germanischer Lloyd, the Kittiwake Bunker Sample Storage System is a completely self-contained unit providing everything needed to comply with the collection, retention and storage of bunker fuel oil samples in accordance with IMO MARPOL regulations.

- All equipment is contained in a robust, metal case that is fully lockable for safe and secure sample storage.
- Certified by Germanischer Lloyd, providing everything you need to ensure that your fuel samples are compliant with IMO MARPOL 73/78 Annex VI regulations.
- Complete with log book to record your sample details, plus training CDs and full instructions on bunker sampling and the latest regulations.
- Replacement consumables and a full range of bunker samples are easily available at short notice from Kittiwake and can be shipped to the destination of your choice.

Sampling Accessories

Fuel Sampler - The fuel sampler is designed to fit into an existing fuel supply line and can be removed with the line full. Supplied in a single size, it can be modified to fit fuel delivery lines between 3 and 12 inches.

Cubitainers - Drip samplers use disposable 'cubitainers'. These hold the oil sample before mixing and transfer to the sample bottles and keep out all external contamination.

Valve Lock - Some authorities, for example the Port of Singapore, require that the sample flow rate is fixed throughout the bunkering period. The Valve Lock device can be fitted to the sampler to ensure the setting remains stable.

Converter Bobbin - The Converter Bobbin is a low cost device designed to allow DNVPS Samplers to use Kittiwake Cubitainers.

Sampler Gauge - Rapid flow of fuel in bunker lines can result in unusual pressure conditions. A gauge is available for monitoring this to prevent the sample being drawn back into the line.

Elbow Kits For Alternative Positions - It is possible to position the sampler tube at an angle to the vertical. Elbow kits are designed to keep the cubitainer bag hanging vertically as either a 45 or 90 degree Elbow.

Fuel Oil Sample Bottles and Labels

Kittiwake produce 750ml HDPE fuel oil sample bottle packs and mailer kits complete with numbered tamper evident caps, labels and mailing cartons*. Kittiwake sample bottles have been tested and approved for transportation of fuel oil samples by air freight or courier service. All consumables are available either as convenient individual packs, or supplied in bulk to refineries and bunker barge operations.

Sample Bottle Packs and Extra Security Seals

Part Number	Description	Quantity
FG-K3-210-KW	750ml Sample Bottle and Mailer Kit	40
FG-K3-211-KW	750ml Sample Bottle Pack	70
FG-K17111-KW	Bottle Shoulder and Valve Lock Seals	100

Labels

Part Number	Description	Quantity
FG-K26280-KW	IMO MARPOL Approved Fuel Sample Label	1000
FG-K26783-KW	Standard Fuel Sample Label	1000
FG-K17103-KW	Clear Adhesive Marpol Over Label	1000

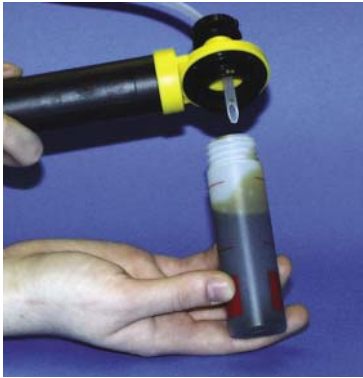
*Mailer cartons only included in FG-K3-210-KW

Ordering Information

Part Number	Description
FG-K11079-WA	Fuel Sampler (x 1 off)
FG-K3-201-KW	Cubitainers (x 24 off)
FG-K1-139-KW	Valve Lock (x 1 off)
FG-K3-021-KW	Convertor Bobbin (x 1 off)
FG-K11168-KW	Sampler Gauge (x 1 off)
FG-K13588-KW	Elbow Kit for 45 degree Elbow
FG-K13589-KW	Elbow Kit for 90 degree Elbow
FG-K16692-KW	Bunker Sampler Plug and Lanyard



Sampling Lubricating Oil

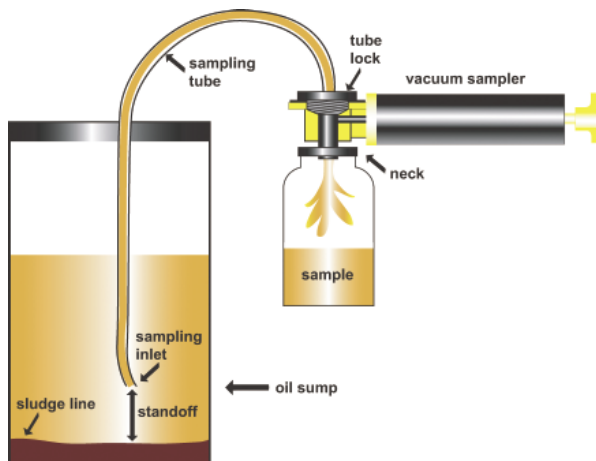


Effective predictive and preventative maintenance programs rely on scheduled oil sampling and analysis programs to provide an accurate indication of equipment and lubricant condition.

Monitoring, control and management of the operating condition of lubricating oils in equipment such as marine diesel engines, generators, turbines and gearboxes is an essential part of the day to day maintenance routines employed by Plant and Facilities Managers around the world.

Sample Extraction Pumps

For simple and effective lube oil sampling from machine sumps and storage tanks, Kittiwake supply durable, easy to use and versatile extraction pumps. These hand operated vacuum pumps can be used for 28 mm and 32 mm screw neck sample bottles. The 28 mm sample pump is designed to fit Kittiwake 60 ml sample bottles and the 32 mm plastic pump is designed to fit 100 ml bottle and the 32 mm metal pump is designed to fit the 750 ml sample bottles.



Ordering Information

Part Number	Description
FG-K11290	28 mm Neck Extraction Pump
FG-K11289	32 mm Neck Extraction Pump (Plastic)
FG-K16991	32 mm Neck Extraction Pump (Metal)



Sample Bottles, Labels and Spares

Sample Bottles - Kittiwake produce a range of HDPE and PET lubricating oil sample bottles. Designed to withstand hot oil under vacuum conditions, supplied in sizes from 60 ml to 750 ml.

Part Number	Volume	Material	Neck (mm)	Quantity
FG-K17123-KW	60 ml	HDPE	28	360
FG-K3-207-KW	100 ml	PET	32	288
FG-K3-211-KW	750 ml	HDPE	32	70

Sample Extraction Tube (LPDE) - Clean LDPE tubing to fit sample extraction pump which can be used with most oil systems. Supplied in 15 meter rolls.

Sample Bottle Labels - Self adhesive, pre-printed labels for fuel or lube oil samples, supplied with custom artwork and text. 1000 per roll.

Clear Over Labels - Clear self adhesive, over labels to protect label and user annotations.



Ordering Information

Part Number	Description
PL-K10215-KW	Sample Extraction Tube
FG-K14297-KW	Sample Bottle Labels
BI-K26522	Clear Over Labels

Non-Hazardous for shipping water in oil test
available where you see the EasySHIP logo



Oil Test Solutions



Simple to Use & Economical.
Fuel and Lube Oil Testing Made Easy.



Make fast on-site maintenance decisions fast with Kittiwake's complete range of oil test kits. An economical range, providing reliable oil condition results in minutes.

Kittiwake's oil test kit range provides a complete set of economically priced equipment, with a level of accuracy suited to routine analysis. Oil test kits provide you with a condition monitoring tool enabling you to make informed operational and maintenance decisions about your critical plant and equipment. 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 and lubricants can identify potential problems, before they become critical. Choose from a range of equipment and parameters to use either individually, or combined as a single test kit.



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

Multi-Parameter Oil Test Kits







Supplied ready for use, in heavy duty aluminium or durable ABS cases, Kittiwake's multi-parameter test kits contain all of the necessary equipment and consumables for your oil condition monitoring needs.

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

Non-Hazardous for shipping water in oil test available where you see the EasySHIP logo



Part Number	Description	Tests Included	Range
FG-K1-002-KW	DIGI Water/Viscosity Kit	DIGI Water in Oil Cell	0.02-1%, 200-10000 ppm, 0-10%, 0-20%
FG-K1-102-KW	 version	ECON Viscostick	go/no go
FG-K1-003-KW	DIGI Basic Kit	DIGI Water in Oil Cell	0.02-1%, 200-10000 ppm, 0-10%, 0-20%
FG-K1-103-KW	 version	ECON Salt Test	go/no go
		ECON Insolubles Test	qualitative
		ECON Viscostick	go/no go
FG-K1-007-KW	DIGI Industrial Kit	DIGI Combined Water in Oil / TBN Cell	0.02-1%, 200-10000 ppm, 0-10%, 0-20% / 5-80 TBN
FG-K1-107-KW	 version	ECON Insolubles Test	qualitative
		ECON Viscostick	Viscosity: go/no go
FG-K1-008-KW	DIGI Field Kit	DIGI Combined Water in Oil / TBN Cell	0.02-1%, 200-10000 ppm, 0-10%, 0-20% / 5-80 TBN
		ECON Insolubles Test	qualitative
		ECON Viscostick	go/no go
		ECON TAN Test	TAN: 0-3
FG-K1-010-KW	DIGI Combined Kit	DIGI Combined Water in Oil / TBN Cell	0.02-1%, 200-10000 ppm, 0-10%, 0-20% / 5-80 TBN
FG-K1-110-KW	 version	ECON Salt Test	go/no go
		ECON Insolubles Test	qualitative
		ECON Viscostick	go/no go
FG-K14971-KW	DIGI Clean Oil Kit	DIGI Water in Oil Cell	0.02-1%, 200-10000 ppm, 0-10%, 0-20%
		DIGI Viscotube	20 - 600 cSt @ 40 °C
		ECON TAN Test	0-6 TAN
FG-K16897-KW	DIGI Biodiesel Test Kit	DIGI Low Range Water in Oil Cell	0.02-1%, 100-3000ppm, 0-10%
		Low Range Falling Ball Viscometer	1 - 10 cSt @ 40 °C
		Density Hydrometer	850-950 kg/m3
		Free Fatty Acid Test / TAN Test	Acid Content / 0-6 TAN
		Visual Test (Cleanliness)	qualitative

NB: Electronic laboratory grade analysis equipment is also available for Water in Oil, Total Base Number (TBN), Total Acid Number (TAN) and Insolubles. See the Oil Analysis Solutions Brochure for further details.

Kittiwake Test Cells

At the heart of Kittiwake on-site oil test solution range, is the DIGI Test Cell, providing simple, accurate results for Water in Oil and Total Base Number (TBN).

With an easy to read digital display providing instructions and results, a five year (10,000 tests) battery life and built in memory for recording previous test results, the Kittiwake DIGI Cell has become a favoured test method worldwide for on-site and on-board testing. Alternatively, the Kittiwake ECON Test Cells offer simple, analogue results. Test cells are available individually for either Water in Oil or Total Base Number (TBN). Alternatively, a DIGI Combined Test Cell is available that performs both test parameters in a single cell.

Both types of test cells have recently been upgraded to offer increased functionality and usability. All reagents and test methods remain the same.



Water in Oil



Maintain and protect your equipment, whilst eliminating damage caused by water in your oil.

The DIGI Water in Oil Test Kit provides state of the art, digital analysis and gives fast, accurate results for easy monitoring of trends. Alternatively, the ECON Water in Oil Test Kit contains a simple, analogue test cell together with all necessary reagents and equipment for an easy to use, economical test.

Ordering Information

FG-K1-001-KW: DIGI Water in Oil Kit

FG-K1-101-KW: **DIGI Water in Oil Kit**

FG-K17032-KW: DIGI Water in Oil Kit (Low Range)

Range:	0.02-1%, 200-10000 ppm, 0-10%, 0-20%
Range (LR):	0.02-1%, 100-3000ppm, 0-10%
Test Time:	2 minutes
Memory:	Previous test, plus five oils
Battery Life:	Five years (10,000 tests)

FG-K13958-KW: ECON Water in Oil Test Kit

Range:	0-1.2%
Accuracy:	Typically 0.1 %
Test Time:	2 minutes

- Prevent corrosion, cavitation or failure of your machinery by detecting water in oil, before any damage occurs.
- Minimise instability of additive packages and damaging microbe growth by monitoring your oil.
- Fully portable for use on-board or in the field, test cells are extremely robust, durable and easy to use.

Total Base Number (TBN)

DIGI TBN Test Kit



Measure your oil's alkaline reserve and ability to neutralise acids from combustion.

The DIGI TBN Test Kit provides state of the art, digital analysis and gives fast, accurate results for in-depth monitoring of trends. The ECON TBN Test Kit gives a rapid indication of TBN depletion in lubricants.

Ordering Information

FG-K1-004-KW: DIGI TBN Test Kit

Range:	5-80 TBN
Accuracy:	Typically +/- 10% of new oil TBN
Test Time:	2 minutes
Memory:	Previous test, plus five oils
Battery Life:	Five years (10,000 tests)

FG-K13959-KW - ECON TBN Test Kit

Range:	5 - 55 TBN
Accuracy:	Typically +/- 10% of new oil TBN
Test Time:	2 minutes

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

Viscosity

DIGI Viscotube



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

The Kittiwake DIGI Viscometer (or Viscotube) uses the falling ball technique to measure the viscosity of an oil. The DIGI Viscotube is provided with viscosity calculation software and a Digital Thermometer for accurate results.

The ECON Viscostick gives a simple go / no-go result. Typically it will detect 5-10% distillate fuel dilution of an SAE 30 to 40 engine oil as well as increases in viscosity due to oil contamination.

- Make informed maintenance decisions and prevent costly machinery downtime.
- Measuring oil viscosity provides early detection of contamination, fuel ingress and shear thinning.
- Suitable for hydraulic oils, diesel engine oils, enclosed gears and fuel oils.
- Simple, cost effective equipment requiring no consumables.

Ordering Information

FG-K14828-KW: DIGI Viscotube

Range:	20-600 cSt @ 40°C using three sizes of ball
Application:	Lubricating oils, hydraulic oil, warm fuel oil
No. of Tests:	Unlimited
Test Time:	1 - 10 Minutes

FG-K3-020-KW: ECON Viscostick

Range:	Go / no go
Application:	Lubricating oils, viscous hydraulics
No. of Tests:	Unlimited
Test Time:	1 Minute

ECON Viscostick



Total Acid Number (TAN)

ECON TAN Test Kit



Testing for TAN is essential to maintain and protect your equipment, preventing damage in advance.

Measure both the weak organic and strong inorganic acids present within an oil, with the Kittiwake TAN Test. A rise in TAN is indicative of oil oxidation due to time or operating temperature.

- Test kit is supplied with up to fifty tests, enabling you to monitor TAN level trends.
- Simple to use drop test - the result is shown by a colour change, providing you with easy-to-interpret results, suitable for use by non-technical personnel.

Ordering Information

FG-K24743-KW: ECON TAN Drop Test Kit

Range:	0-6 TAN
Application:	Turbine, gear and hydraulic oils
Test Time:	2 Minutes
Accuracy:	+/- 0.3 TAN
No. of Tests:	circa 50

Salt Water Contamination

ECON Salt Test



Eliminate rapid corrosion in lube oil, fuel or hydraulic systems by checking for the presence of salt.

- Provides rapid indication of the presence of salt, even if all the water has been evaporated.
- Fast and easy to use.

Ordering Information

FG-K1-005-KW: ECON Salt Water Contamination Test Kit

Range:	Go / no go
Application:	Lubricating oil, fuel, water
Test Time:	1 hour (unattended)
No. of Tests:	25

Insolubles



Monitor combustion related debris and oxidation products.

High insolubles will cause lacquer formation on hot surfaces, sticking of piston rings and wear of cylinder liner and bearing surfaces. The detergent property of the oil will also decrease, speeding further deterioration.

- Detect insolubles from diesel engine combustion products such as fuel ash, carbon, partially oxidised fuel, oil oxidation products and spent lubricant additive.
- Simple and quick to use, the Insolubles tests available give you actionable results, helping prevent engine damage

Ordering Information

FG-K17105-KW: DIGI Insolubles Meter

Range:	0-2.5%
Accuracy:	Typically +/-0.1%
Test Time:	< 2 Minuts
Battery Life:	> 3000 Tests
No of Tests:	50
Application:	Diesel Engine Lubricants, Gas Engine Lubricants, Compressor Oil
Sample (ml):	10ml

FG-K1-006-KW: ECON Insolubles Test Kit

Range:	Qualitative
Application:	Diesel engine lubricants
No. of Tests:	100
Test Time:	1 hour (unattended)

Reagents, Spares and Consumables



Kitiwake test kits for individual parameters contain reagents, consumables and full instructions for multiple tests.

- Replacement reagents can be ordered at short notice.
- Kits contain all necessary equipment for instant test results in the field.
- Reagents are packed in accordance with IATA/IMDG/IRD Air/Marine/Road Transportation codes and can be delivered to major ports world-wide.

Particle Contamination

Hydraulic Particles (Patch Test)



Monitoring your hydraulic and gearbox oils is a necessary part of any preventative maintenance programme.

One of the most valuable indicators of machinery condition is oil cleanliness. The presence of particulate contamination in hydraulic or gearbox oils can be catastrophic. Monitoring fluid cleanliness levels assists in identifying abnormal conditions and preventing potential machinery damage.

Ordering Information

FG-K14368-KW: Hydraulic Particles Test Kit

Range:	Qualitative
Application:	Hydraulic oil, gearbox lubricants
No. of Tests:	100
Test Time:	5 minutes



- Identify abnormal conditions as part of your preventative maintenance programme.
- Clear and easy examination of particle contamination.
- No interference from water droplets or pearlescent fluids.
- Comes complete with a full instruction manual, containing contamination charts for easy analysis of results.
- Test kit is supplied in a fully portable, robust case for quick and easy testing in the field.