DIGI Field Test Kits

ENGINEERING YOUR SUCCESS.

Parameters

	Water in Oil	TBN (Total Base Number)	TAN (Total Acid Number)	Insolubles (Soot)	Viscosity
Diesel Engine Oil	✓	✓	-	✓	✓
Diesel Engine Oil (Cylinder Oil)	✓	✓	-	-	-
Heavy Fuel Oil	✓	-	-	-	✓
Distillate (Diesel/Gas Oil) Fuel Oil	✓	-	-	-	-
Hydraulic Oil	✓	-	✓	-	✓†
Gear Oil	✓	-	✓	-	✓
Greases	-	-	-	-	-
Gas Engine Oil (Dual Fuel)	✓	-	✓	-	✓
Gas Engine Oil (Stoichiometric)	✓	✓	✓	-	✓
Compressor Oil	✓	-	✓	✓	✓
Turbine Oil	✓	-	✓	-	✓†

† Recommended test to ensure correct grade, prior to adding oil to the system

DIGI Field Test Kit
FGK1108PA

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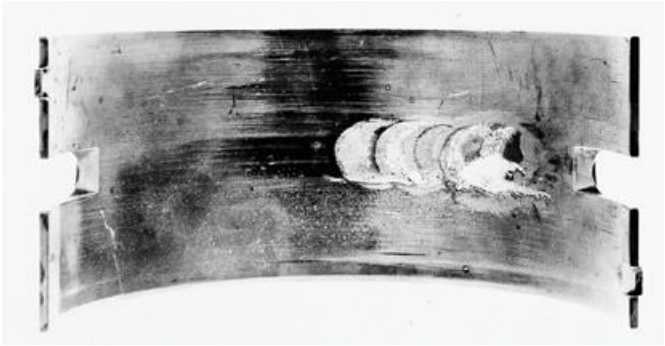
Distillate (Diesel/Gas Oil) Fuel Oil	✓	-	-	-	-
Hydraulic Oil	✓	-	✓	-	✓†
Gear Oil	✓	-	✓	-	✓
Greases	-	-	-	-	-
Gas Engine Oil (Dual Fuel)	✓	-	✓	-	✓
Gas Engine Oil (Stoichiometric)	✓	✓	✓	-	✓
Compressor Oil	✓	-	✓	✓	✓
Turbine Oil	✓	-	✓	-	✓†

† Recommended test to ensure correct grade, prior to adding oil to the system

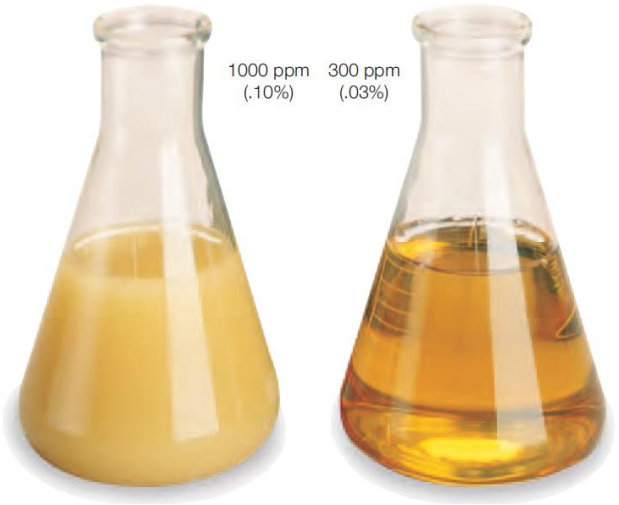
Water in Oil

Effects

- Surface Corrosion
- Metal to Metal Contact
- Reduces Lubricating characteristics
- Additive Package Instability
- Microbiological Growth
- Reduced power transfer capabilities



Water in Oil



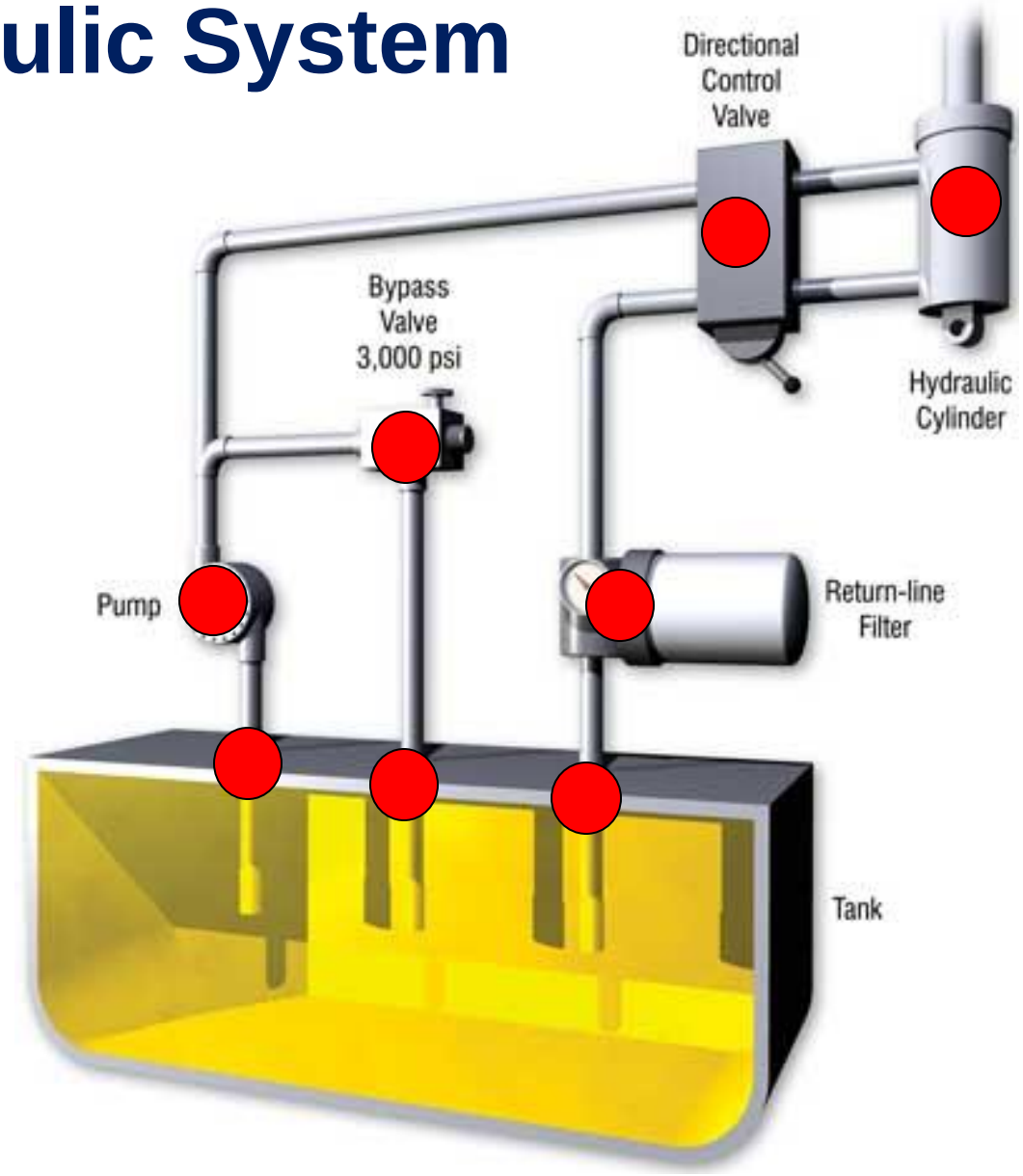
Caused by:

- Leakage – Heat Exchangers/Coolers
- Condensation
- Blow-by
- Tank Vents/Reservoir Leaks
- Incorrect/Contaminated Top-Up
- Poor system design
- Poor maintenance program/Condition Monitoring

Typical Warning Limits:

- Hydraulic Fluid 300ppm (0.03%)
- Engine Lubricants 1500ppm (0.15%)
- Gear Oils 1500ppm (0.15%)

Hydraulic System



How to

- **Press any button to turn on**
- **Press middle button to select range**
- **Press “NEXT” to begin test**

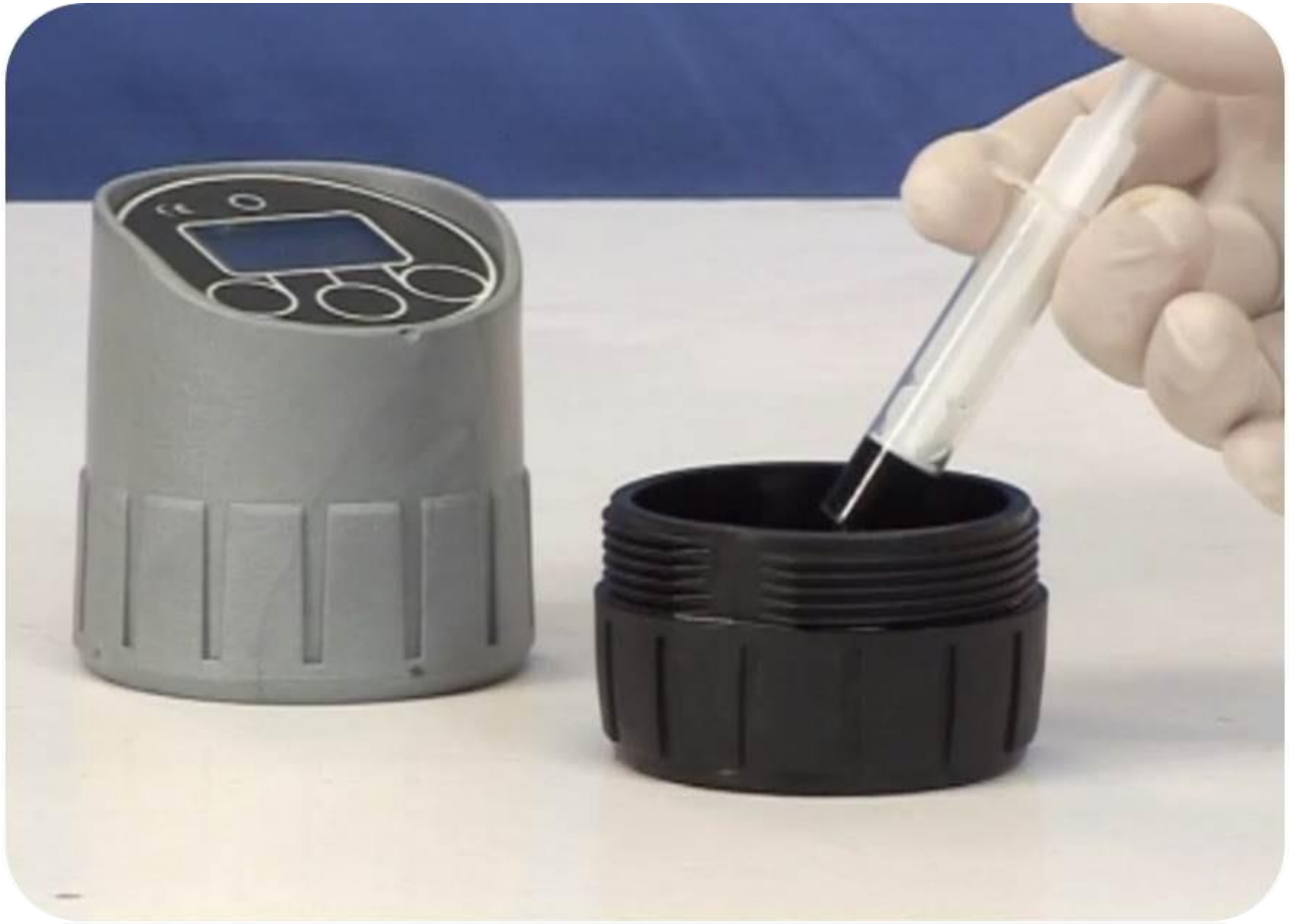
How to

- **Follow the intructions:**

How to

- **Add Reagent A to the top line**
  (note; for lowest range test, volume is increased – use syringe)

How to



- **Add oil sample (volume is displayed on screen)**

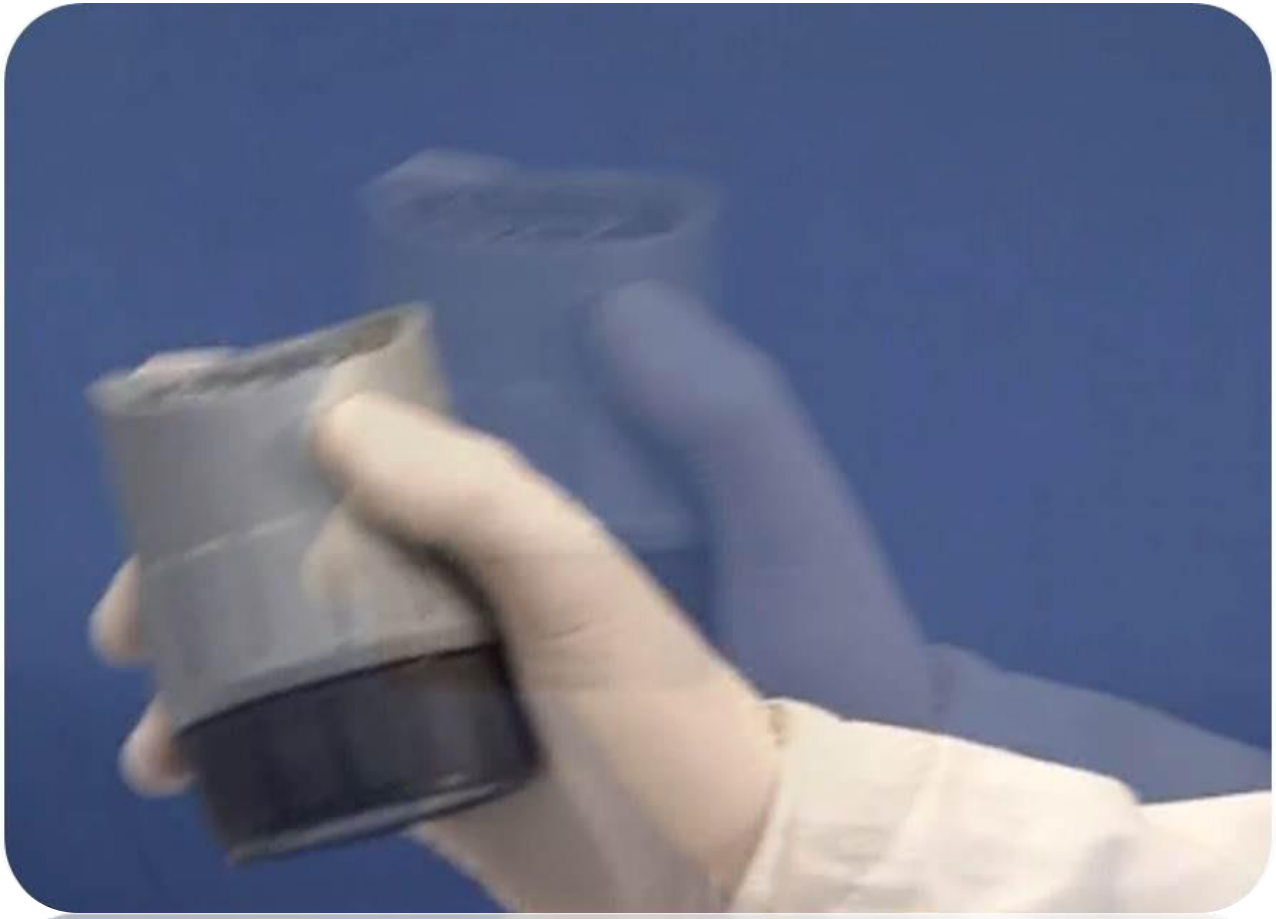
How to

- **Open EasySHIP tube and add to cell with agitator**

How to

- **Press “START”**

How to



- **Shake for 3 minutes**

How to

- **Result displayed on screen**

Warning Levels for Engine Oils

- NORMAL (ACCEPTABLE) < 0.05% (<500ppm)

- ABNORMAL (CAUTION) > 0.05% and <0.15% (500 - 1500ppm)

- EXCESSIVE (CRITICAL) ≥ 0.15% 1500ppm +

DIGI Field Test Kit

	Water in Oil	TBN (Total Base Number)	TAN (Total Acid Number)	Insolubles (Soot)	Viscosity
Diesel Engine Oil	✓	✓	-	✓	✓
Diesel Engine Oil (Cylinder Oil)	✓	✓	-	-	-
Heavy Fuel Oil	✓	-	-	-	✓
Distillate (Diesel/Gas Oil) Fuel Oil	✓	-	-	-	-
Hydraulic Oil	✓	-	✓	-	✓†
Gear Oil	✓	-	✓	-	✓
Greases	-	-	-	-	-
Gas Engine Oil (Dual Fuel)	✓	-	✓	-	✓
Gas Engine Oil (Stoichiometric)	✓	✓	✓	-	✓
Compressor Oil	✓	-	✓	✓	✓
Turbine Oil	✓	-	✓	-	✓†

† Recommended test to ensure correct grade, prior to adding oil to the system

What is TBN?

- Total Base Number
  - More commonly called Base Number

- It is simply an indication of the amount of alkaline reserves in your oil.
- Additives in the oil/lubricant are in there protect your system components from the corrosion that comes with acid contamination.
- When TBN falls, protection falls.

Scientists TBN

- **Total base number** (**TBN**) is a measure of a lubricant's reserve alkalinity. It is measured in milligrams of potassium hydroxide per gram (mg KOH/g).

- TBN determines how effective the control of acids formed will be during the combustion process. The higher the TBN, the more effective it is in suspending wear-causing contaminants and reducing the corrosive effects of acids over an extended period of time.

Total Base Number (TBN)

Effects of Low TBN

- Corrosion
- Increased Component Fouling

Decreases due to:

- Acidic Combustion By-Products
- Oxidation of Lubricant

Typical Warning Levels

- 50-60% of New Oil TBN – Marine Diesels
- <20% of New Oil TBN – Aux Power plant

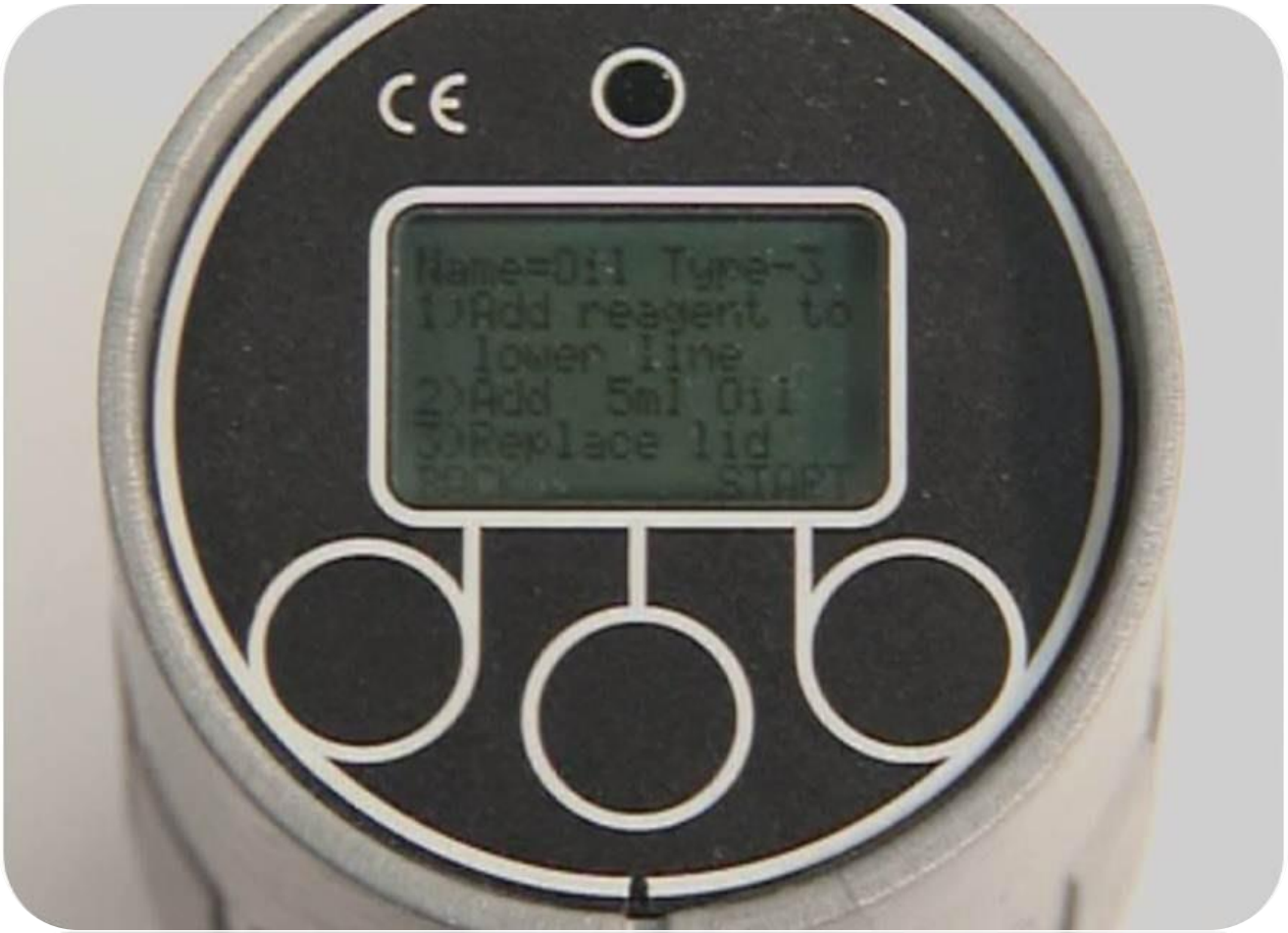
Base Additives' Features

- **Rust Inhibitors –** Forms a barrier to repel water
- **Antioxidants/oxidation inhibitors** – Scavenge pro-oxidants, decompose hydro-peroxides & metal deactivator
- **Dispersant & Detergent** – Keeps the soot particles small & cleanse high temperature surfaces
- **Anti-wear & Extreme-pressure Additives** – Protect lubricated components from excessive friction
- **VI Improvers** – Help boost viscosity index of lubricants that are routinely exposed to wide ranging oil temperatures
- **Foam inhibitors/ Defoamants** – Inhibit the formation of stable foams
- **Pour Point Depressors** – Allow oil & lubricants to flow at low temperatures.

How to

- **Press middle button to select the oil**
- **Press “NEXT” to begin test**

How to

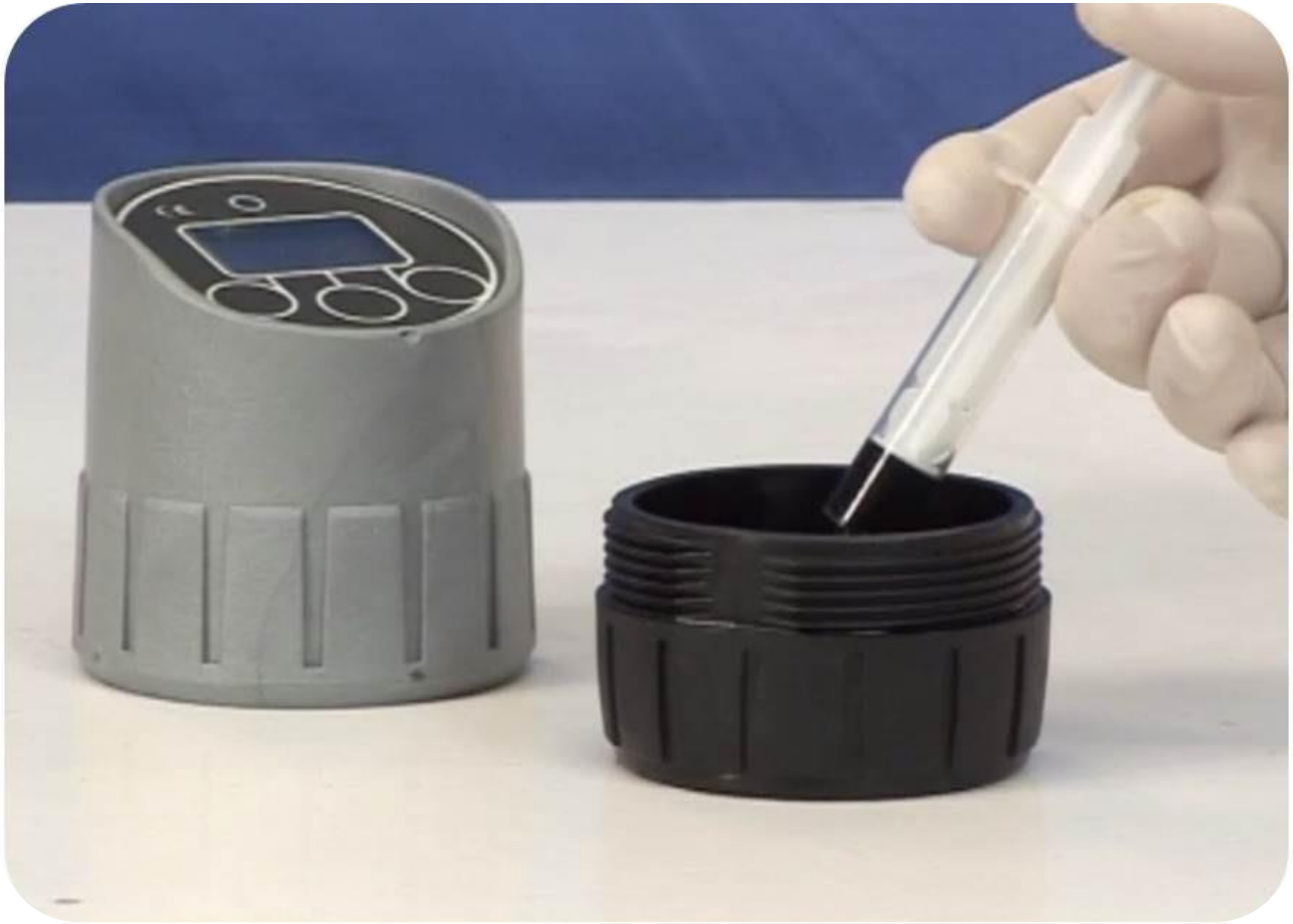


- **Follow the intructions:**

How to

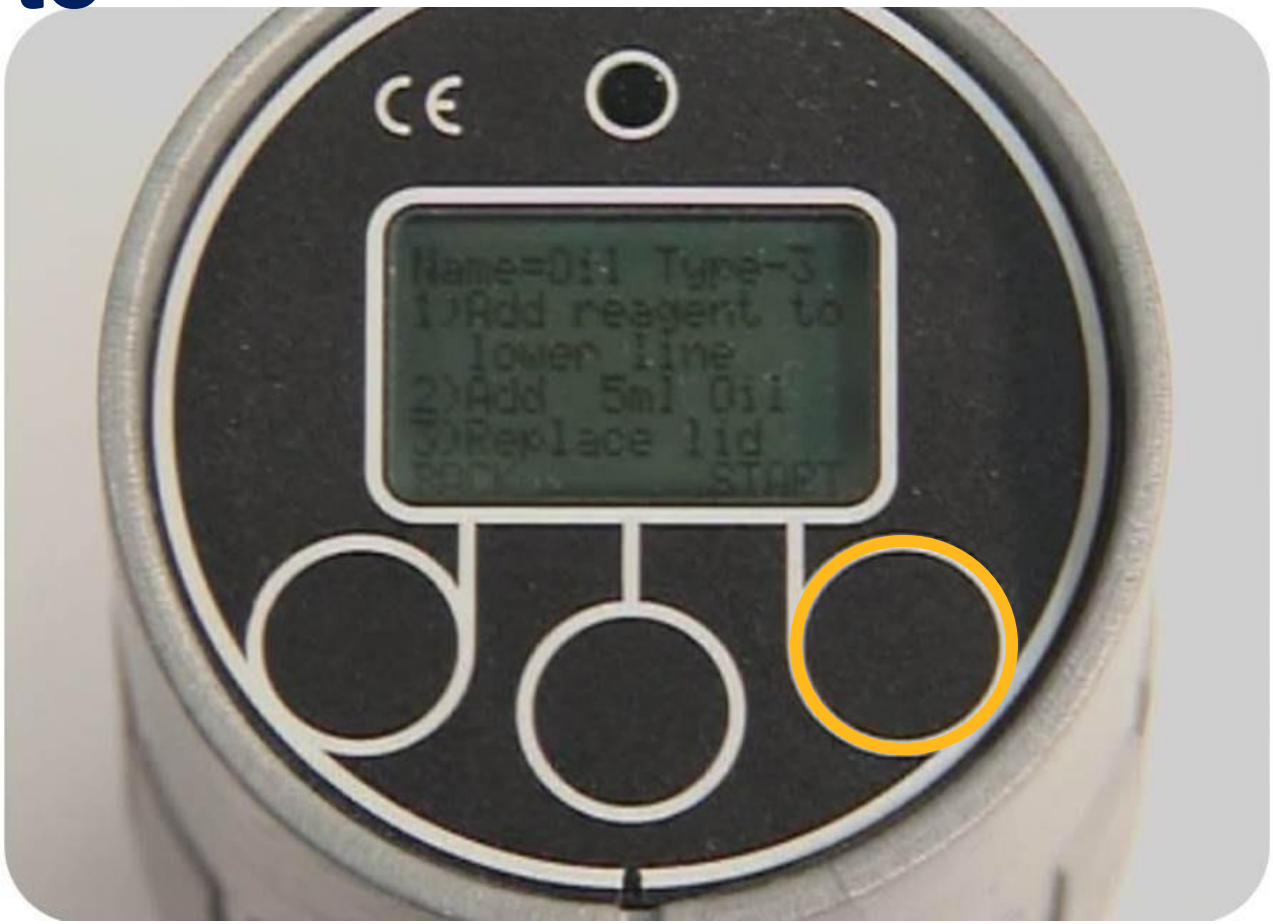
- **Add Reagent C to the bottom line**

How to



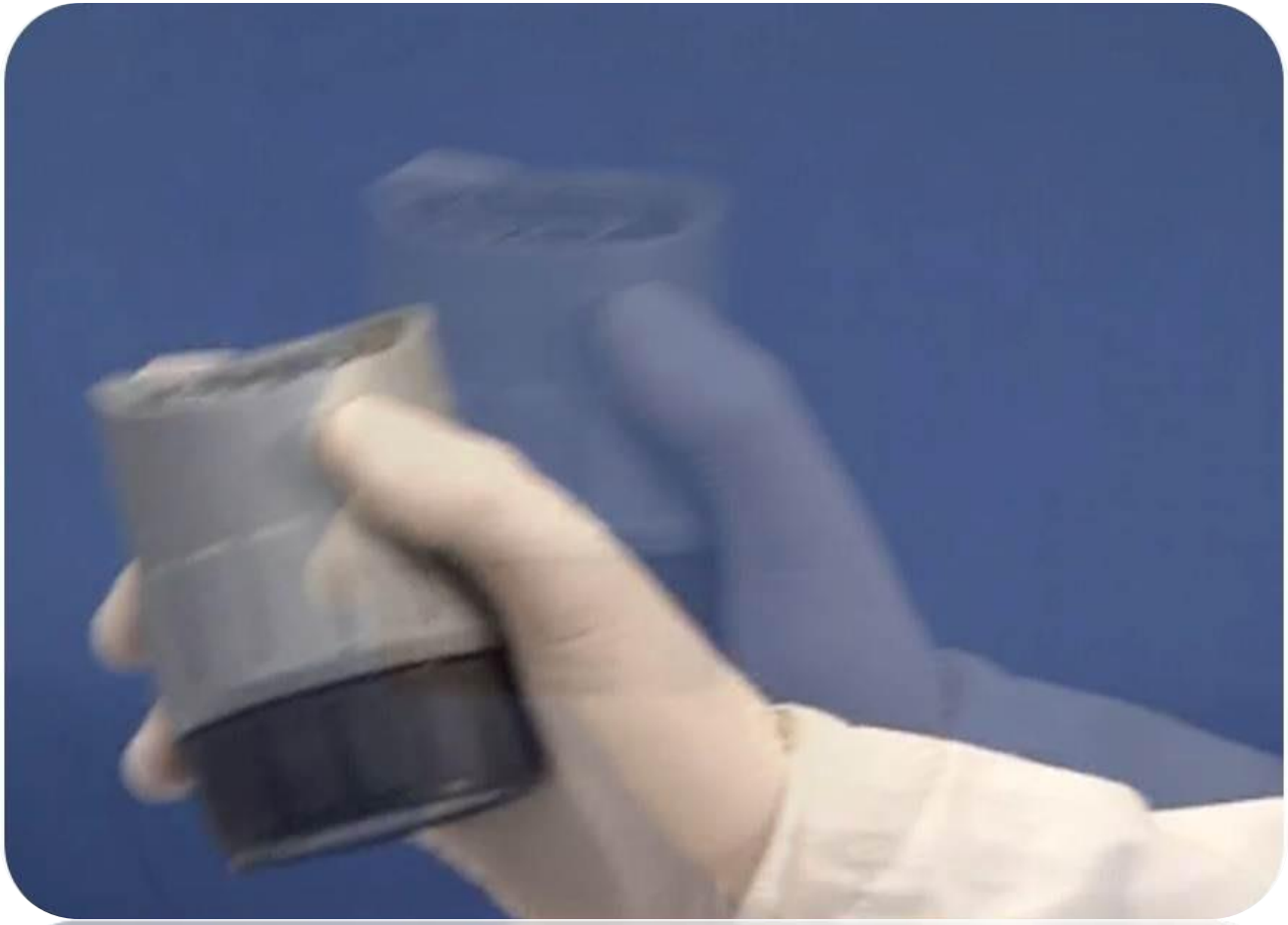
- **Add oil sample (volume is displayed on screen)**

How to



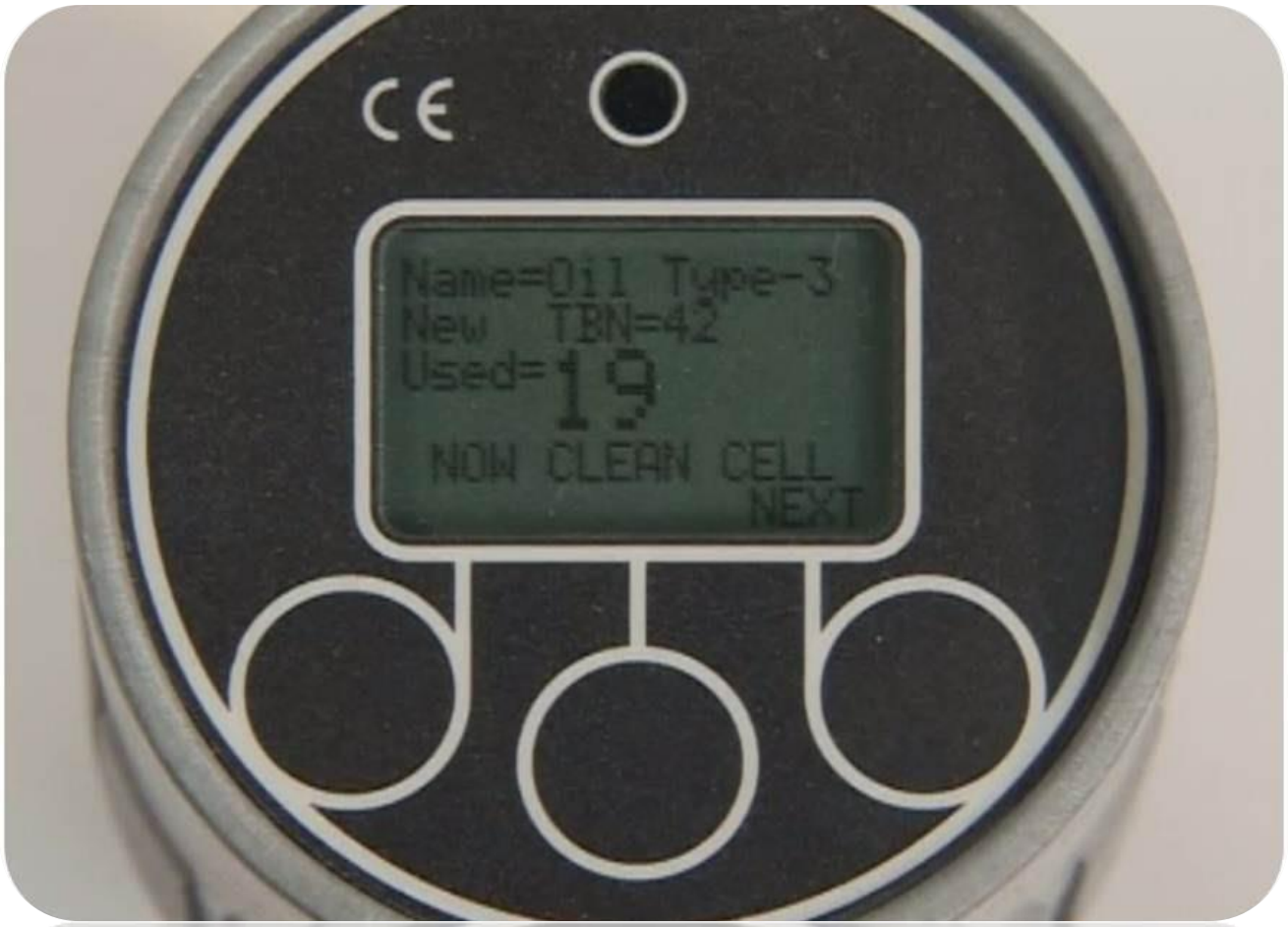
- **Press “START”**

How to



- **Shake for 2 minutes**

How to



- **Result displayed on screen**

NOTE: for each oil type, a calibration test on new oil must be run (once only) BEFORE testing used oil.

DIGI Field Test Kit

	Water in Oil	TBN (Total Base Number)	TAN (Total Acid Number)	Insolubles (Soot)	Viscosity
Diesel Engine Oil	✓	✓	-	✓	✓
Diesel Engine Oil (Cylinder Oil)	✓	✓	-	-	-
Heavy Fuel Oil	✓	-	-	-	✓
Distillate (Diesel/Gas Oil) Fuel Oil	✓	-	-	-	-
Hydraulic Oil	✓	-	✓	-	✓†
Gear Oil	✓	-	✓	-	✓
Greases	-	-	-	-	-
Gas Engine Oil (Dual Fuel)	✓	-	✓	-	✓
Gas Engine Oil (Stoichiometric)	✓	✓	✓	-	✓
Compressor Oil	✓	-	✓	✓	✓
Turbine Oil	✓	-	✓	-	✓†

† Recommended test to ensure correct grade, prior to adding oil to the system

What is TAN?

- Total Acid Number
  - Also Known as Acid Number

- 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 Parker Kittiwake TAN Test. A rise in TAN is indicative of oil contamination.

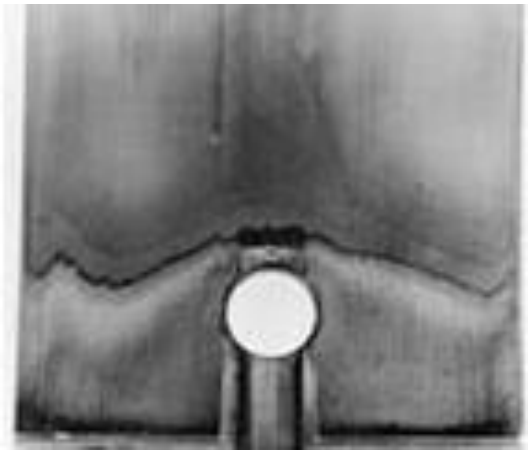
Total Acid Number (TAN)

Effects of High TAN :

- Corrosion
- Increased Viscosity
- Lacquering

Increases due to:

- Acidic Combustion By-Products
- Lubricant Oxidation By-Products
- Contamination
- Cavitation



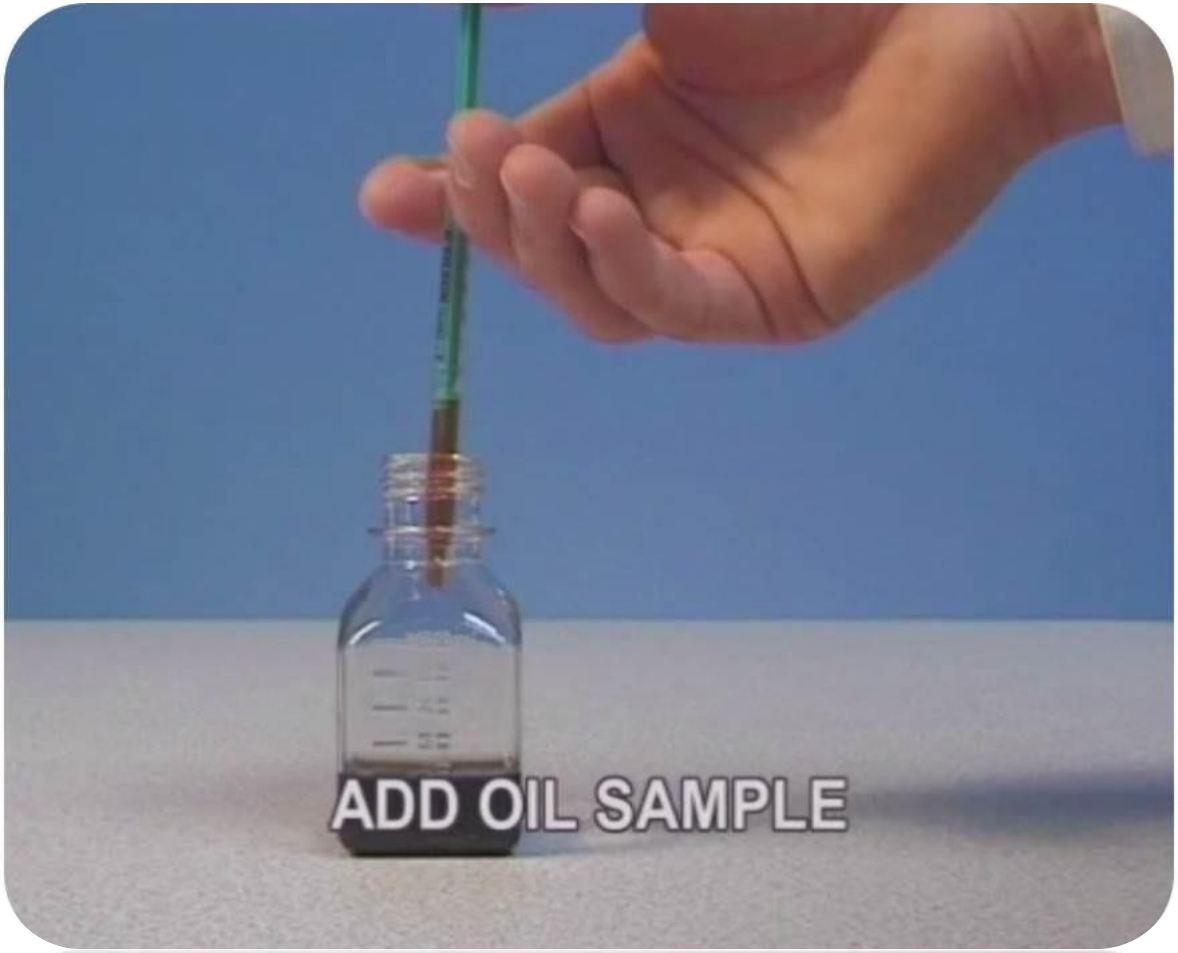
Typical Warning Levels:

- + 0.6 from nominal – Turbines
- + 0.9 from nominal – Hydraulics
- + 4 from nominal – Enclosed Gears
- + 2 from nominal – Compressors

How to

How to

How to



- **Manual shows volume to add**

How to

How to

How to

Expected TAN	Sample Size	Factor
0 - 1.5	2 ml	0.05
0 - 3	1 ml	0.1
0 - 6	0.5 ml	0.2

Number of drops × Factor = TAN Value

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Hydraulic Oil	✓	-	✓	-	✓†
Gear Oil	✓	-	✓	-	✓
Greases	-	-	-	-	-
Gas Engine Oil (Dual Fuel)	✓	-	✓	-	✓
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Compressor Oil	✓	-	✓	✓	✓
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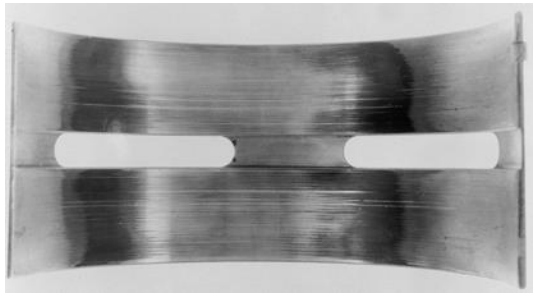
Insolubles



Effects on the oil:

- Increased Oil Viscosity
- Dispercancy loss – accumulation of particles
- Anti-wear Performance loss

Effects on the machine:

- Premature blockage of filters
- Fouling of Engine Components
- Deposit formation, sludge & oil-way blockage

Insolubles cont..

Increases due to:

- Carbon from Incomplete Combustion
- Polymers from Oxidation
- Sulphates from TBN/Sulphur Reaction
- Reaction with water (hydraulic system)

Typical Warning Levels:

- >2.0% High Speed Diesel Engines
- >3.0% Medium Speed Diesel Engines
- >2.0% High Speed Diesel Engines
- >3.0% Slow Speed Diesel Engines

Control

- Low-flow bypass filters and centrifuges

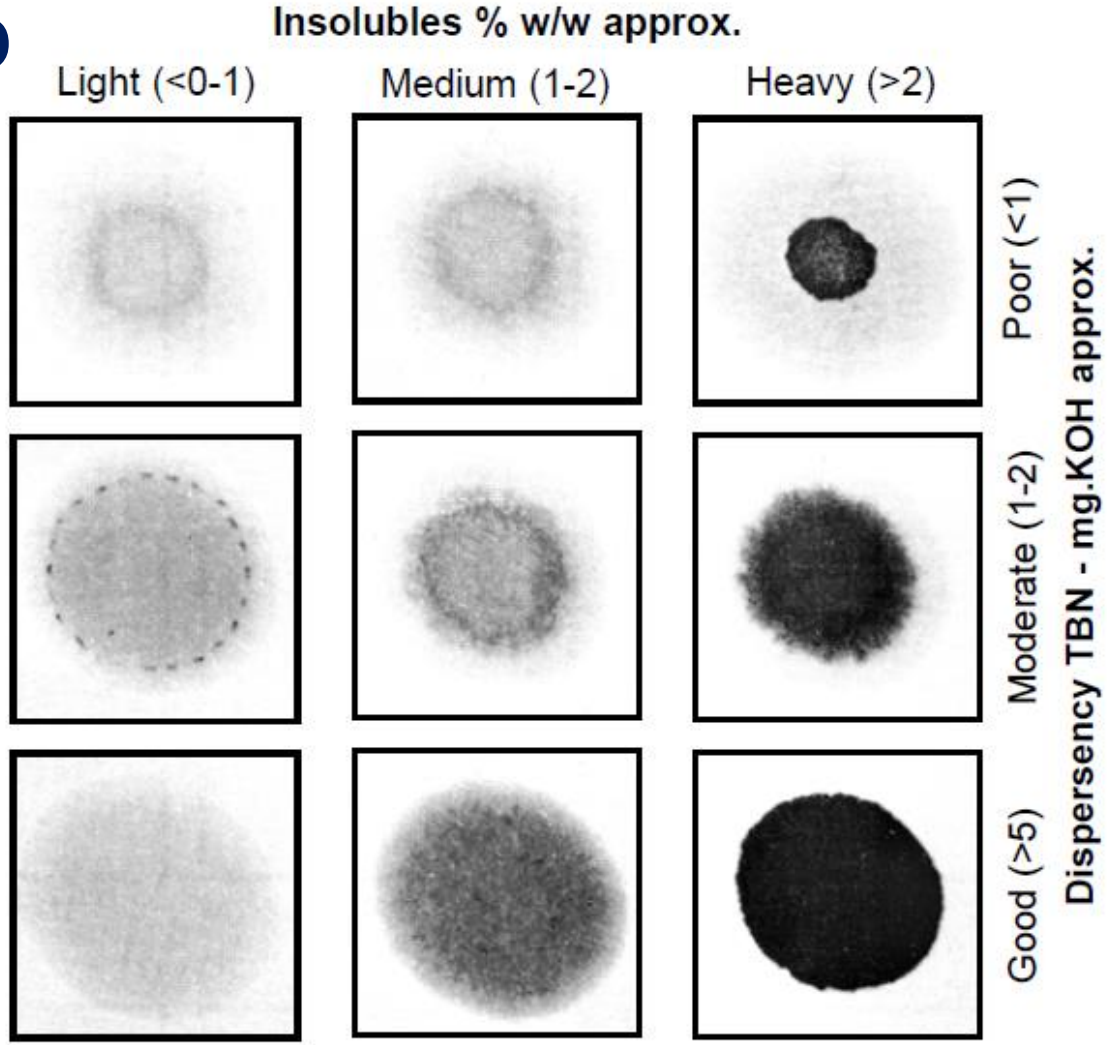
How to

- **Shake sample and pour into beaker**

How to

- **Dip rod into oil**
- **First drop back to beaker**
- **Second drop onto test paper**

How to



- **Leave to dry**
- **Compare to chart**

DIGI Field Test Kit

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Compressor Oil	✓	-	✓	✓	✓
Turbine Oil	✓	-	✓	-	✓†

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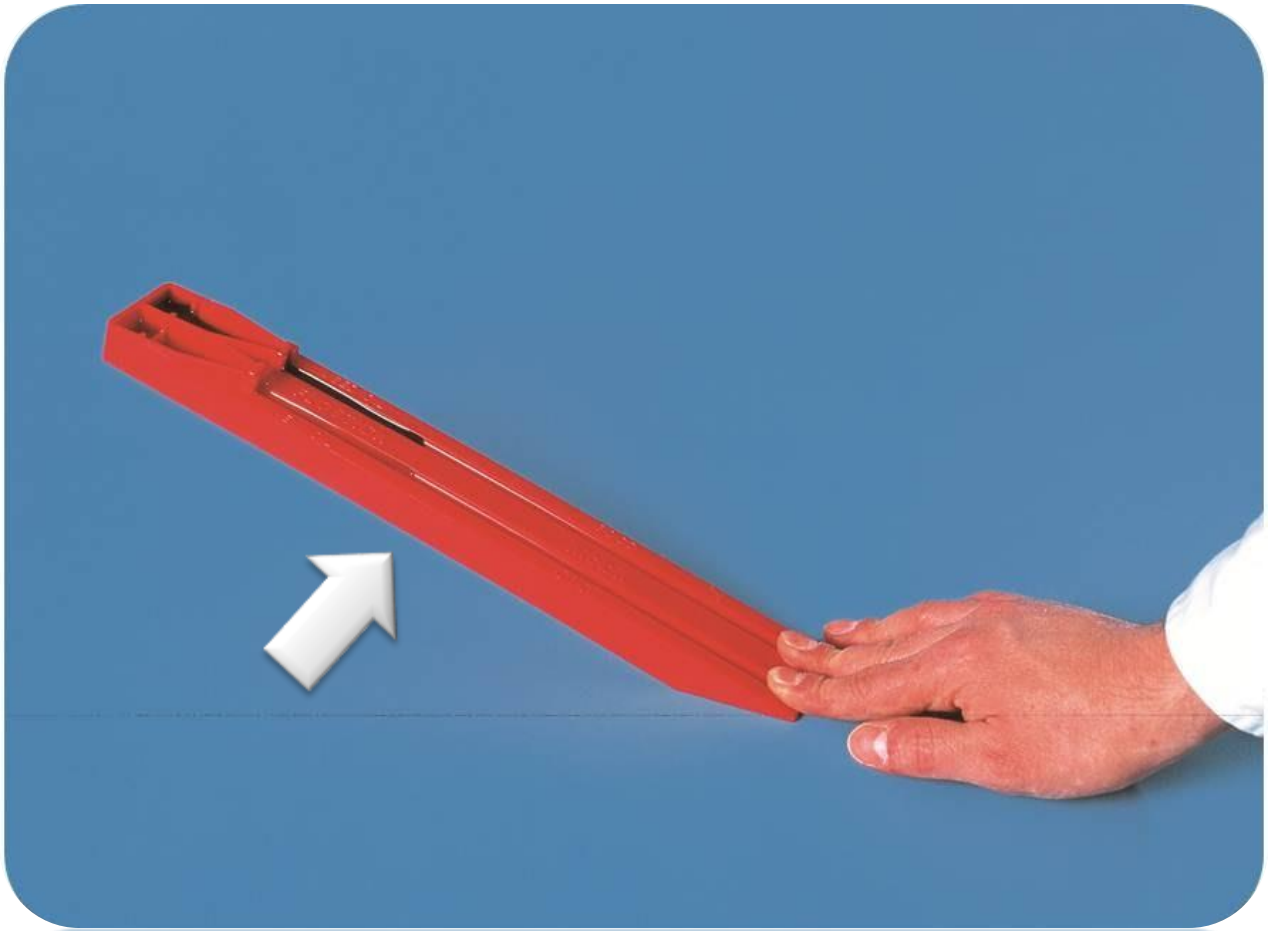
How to

- **Shake sample and pour into beaker**
- **Leave to come to room temperature**

How to

- **Add 5ml NEW oil (room temperature) to side marked**
- **Add 5ml of USED oil sample (room temperature) to side marked**

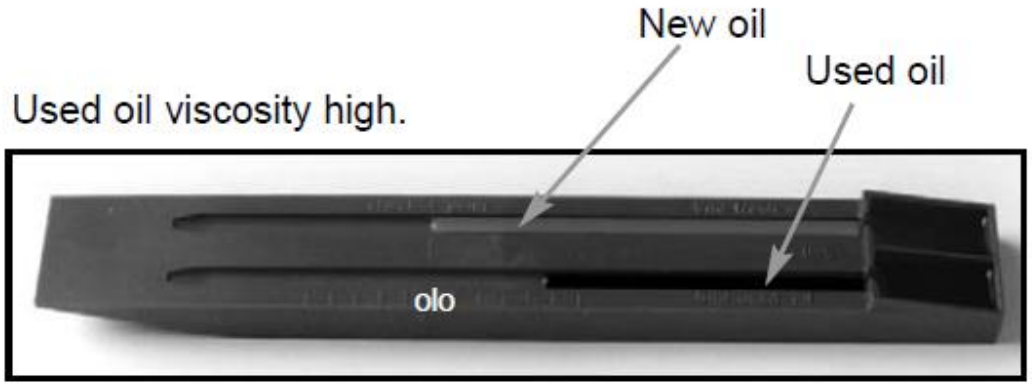
How to



- **Tilt until new oil reaches “Check Point”**

How to

A Used oil viscosity high.



B Used oil in satisfactory condition.

C Used oil viscosity low.

DIGI Field Kit - Reagent Packs

Consumable packs provide good ongoing business

- **Water in Oil reagent pack (50 tests)**
  FGK2101PA
- **Total Base Number reagent pack (50 tests)**
  FGK2002PA
- **Total Acid Number/TAN drop reagent pack (25 tests)**
  FGK24743PA
- **Insolubles reagent pack (50 tests)**
  FGK2003PA

DIGI Field Kit - Related Products

- **Filtration!!! After diagnosis, provide the solution!**