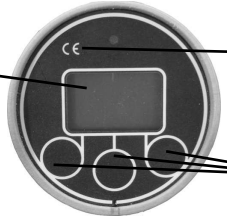
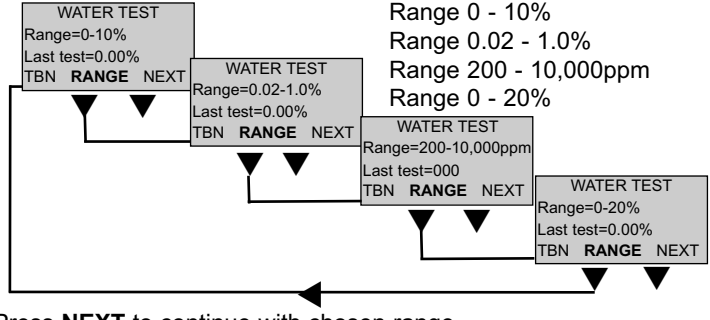
Water in Oil Test

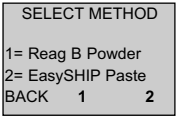


Battery guaranteed for 5 years (or 5000 tests).

Press Right hand button to switch cell on.
Cell will auto power off after 6 minutes inactivity.
Press **WATER** to switch between WATER/TBN mode.
Press **RANGE** to change the required range of the test.
Four test ranges are available:



Press **NEXT** to continue with chosen range.



Press **1** to run the test with Reagent B Powder or **2** to test with EasySHIP Paste.

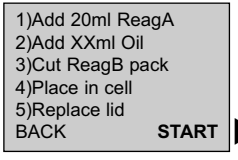
When using Reagent B Powder

Before starting the test: make sure that the inside of the cell is clean and dry (pay particular attention to the seal).

Always start the test with the highest range selected, when in doubt about the approximate amount of water in your test oil. Overpressure can occur if an oil sample is tested with a very high water content on the low range 0.02-1% (200-10000ppm). This can cause permanent damage to the pressure sensor.

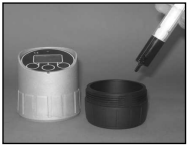
Shake the bottle of Reagent A thoroughly.

Begin test by following on screen instructions.



NB: The amount of oil used changes with the range. Always use 20ml Reagent A (or up to the top line in the cell).

Always use gloves and tweezers when handling Reagent B.



Replace lid and press **START** to begin test.

Turn page for remainder of test

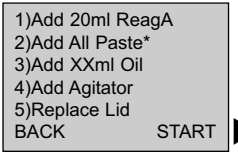
When using EasySHIP Paste

Before starting the test: make sure that the inside of the cell is clean and dry (pay particular attention to the seal).
EasySHIP Test Reagent must be above 18ºc

Always start the test with the highest range selected, when in doubt about the approximate amount of water in your test oil.
Overpressure can occur if an oil sample is tested with a very high water content on the low range 0.02-1% (200-10000ppm).
This can cause permanent damage to the pressure sensor.

Shake the bottle of Reagent A thoroughly.

Begin test by following on screen instructions.



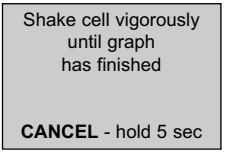
NB: The amount of oil used changes with the range. Always use 20ml Reagent A (or up to the top line in the cell).

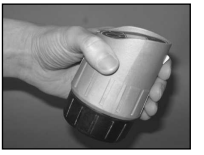
Always use gloves when handling EasySHIP Sachets.

*Squeeze all of the EasySHIP Paste into the centre of the cell

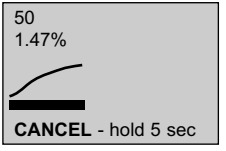
Replace lid and press **START** to begin test.

Skip next page for the remainder of the EasySHIP test method.

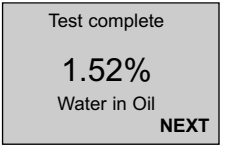




To cancel the test press and hold **CANCEL** for 5 seconds.



A graph will be plotted during the test time
(180 seconds for the EasySHIP Test and 120 seconds for the Reagent B Test).



Your results will be displayed after the graph has been plotted.

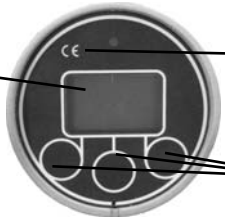
▶ Press **NEXT** to repeat test.

Please make sure that you use the correct amount of reagent and oil. Failure to do this could cause the cell to become over-pressured and damaged.

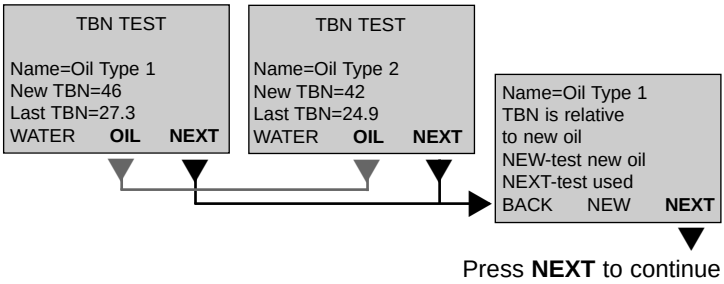
After finishing the test:

Immediately after every test, thoroughly clean the cell and where applicable, the agitator. Use a lint-free rag or tissue and if required, a mild solvent (e.g. Reagent A or IPA).
Do not use water or water based cleaners!

TBN Test



Press Right hand button to switch cell on.
Cell will auto power off after 6 minutes inactivity.
Press **TBN** to switch between WATER/TBN mode.
Select oil desired for test by pressing **OIL**.
If oil is not found, or if you have a new oil, follow ***TBN Setup*** instructions on previous page.



Shake cell
until graph
has finished

CANCEL - hold 5 sec

To cancel the test press and hold **CANCEL** for 5 seconds.

45
31

CANCEL - hold 5 sec

A graph will be plotted during the test time (120 seconds).

Name=Oil Type 1
New TBN = 44

Used TBN = 36

NEXT ▶

Your results will be displayed after the graph has been plotted.

Press **NEXT** to return to first screen.

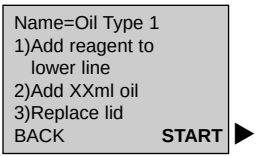
After finishing the test:

Thoroughly clean the cell immediately after every test, using a lint-free rag or tissue and if need be, a mild solvent (e.g. Reagent A or IPA).
Do not use water or water based cleaners!

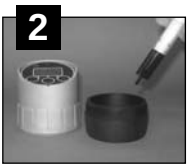
Before starting the test:

Make sure the inside of the cell is clean and dry
(pay particular attention to the seal).

Begin test by following on screen instructions.



NB: Use TBN Reagent C. The amount of oil used changes with the new oil TBN range.



Replace lid and press **START** to begin test.

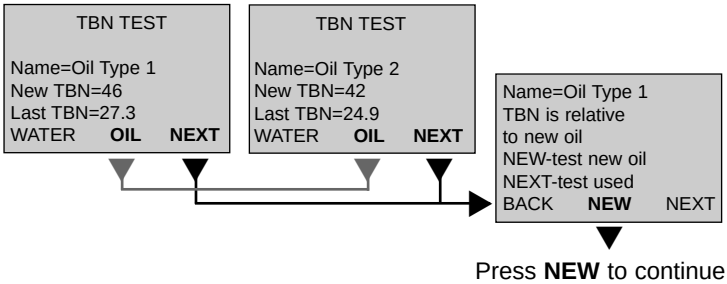
Please make sure that you use the correct amount of reagent and oil. Failure to do this could cause the cell to become over-pressured and damaged.

TBN Setup

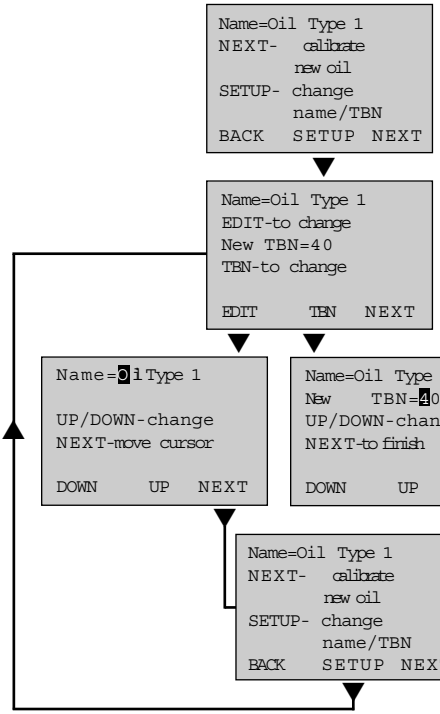
TBN is determined by measuring the pressure build-up in the cell when a predetermined quantity of oil sample is added to a special reagent. The amount of sample needed is determined by the cell measurement processor and is based on the expected TBN. When using this instrument for the very first time it is necessary to calibrate it for each of the oil grades to be measured. The cell is able to hold calibration data for up to seven different oil grades.

The calibration process requires a sample of new oil for each of the grades to be measured. We recommend you use the oil grade name as the "Name" during the cell setup process. The cell should be re-calibrated approximately every six months. The calibration can be checked by using new oil in the TBN test procedure, in place of used oil. The test TBN should be close to the new oil TBN.

Press Right hand touch pad to switch cell on.
Cell will auto power off after 6 minutes inactivity.
Press **TBN** to switch between WATER/TBN mode.
Select the oil to be changed or edited by pressing **OIL**.
Once oil is selected, press **NEXT** to continue.



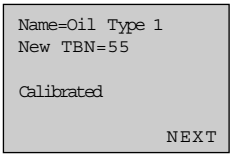
Press **SETUP**, then follow on screen instructions to give your oil a name and change the new oil s TBN.



NB: This screen only appears if a new oil TBN has previously been entered.

Press **NEXT** to continue.

Follow out test instructions as for ***TBN Test*** on next page.



The cell will confirm calibration after the graph has been plotted.

Insolubles Loading

1

Shake the oil sample bottle to mix the contents and pour a small volume into the beaker.

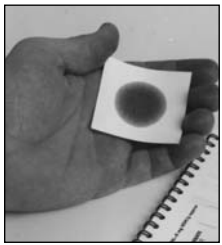
2

Place a clean filter paper on a level surface.

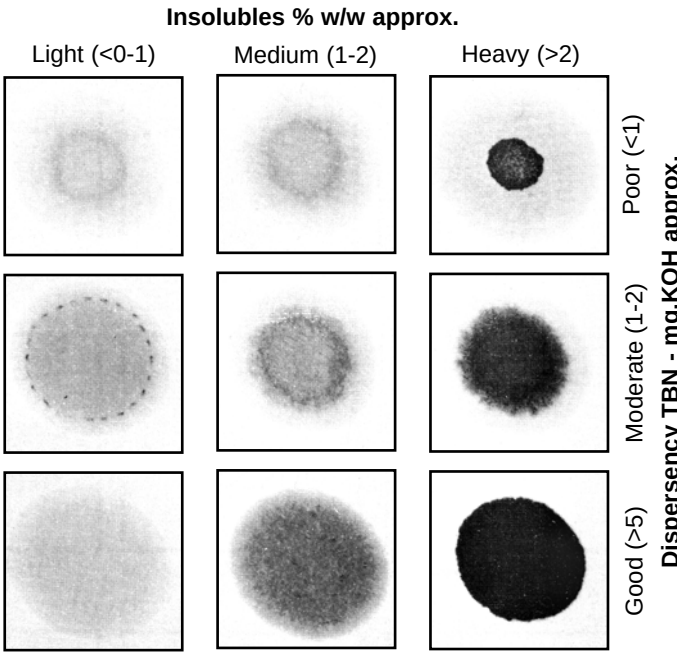
Dip the acetate rod into the oil and allow the first drop to return to the beaker.

Place the second drop onto the paper and set aside for 24 hours.

3



Compare the dried spot with the examples given on the page below.



Insolubles
This is indicated by the shade of the spot. A very dark spot indicates a heavy insolubles loading. If the dispersency is poor, only the centre of the spot will be dark.

Dispersency
This is indicated by the colour change from the centre to outside of the spot. A distinct colour change indicates reduced dispersency. (Low TBN is also an indication of reduced dispersency).

Salt Water Determination

1

Add 2ml of Reagent H to the test tube.

Shake the oil sample and draw off 5ml using the syringe provided. Add this to the test tube, replace the cap and shake vigorously.

Place the tube upright in **hot water** and allow to stand for 1 hour until the water settles out of the oil sample.

2

Take one test pad from the box and replace the lid. Handle the test pads by the edges to avoid contaminating the surfaces with sweat.

Puncture an area 10mm in diameter 10 to 15 times with the pin provided.

3

Flush a pipette with Reagent H. Place the tip in the water layer in the test tube.

Squeeze the bulb gently and draw off a sample of the water into the pipette.

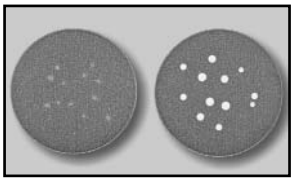
4

Remove the pipette and wipe off any oil and return a few drops of water to the test tube.

Place the next drop of water onto the prepared test pad.

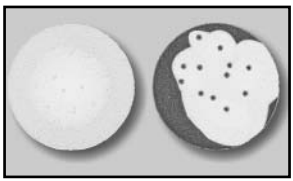
Allow the pad to stand for 5 minutes.

5



Examine the pad:

If there is no yellow colour, or only a very faint yellow patch appears, the contamination is **fresh water.**



If a large yellow patch appears, the contamination is **salt water.**

6 A positive result should always be checked by testing another pad.

Viscosity Comparison

1

Take samples of used and new oil and allow to stand for at least 1 hour.

It is very important that both samples are at the same temperature.

2

Place the Viscosity Stick on a flat, level surface.

Add 5ml of used oil to one reservoir.

Add 5ml of new oil to the other reservoir.

3

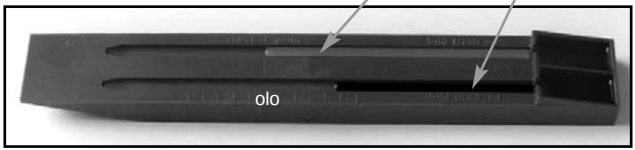
Tilt the Viscosity Stick so that it rests on the angled base and allow the oil to run down the channels. When the new oil reaches the mid point on the scale, return the Viscosity Stick to the horizontal.

4 Examine the point reached by the used oil:

If the used oil has not reached the scale then the viscosity is **higher** than recommended.

If the used oil has over run the scale then the viscosity is **lower** than recommended.

A Used oil viscosity high.



B Used oil in satisfactory condition.

C Used oil viscosity low.