MOBILE OIL TESTER KIT (MOT)

USER GUIDE

Version 2.0

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Disclaimer
Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain. Always ensure the correct configuration, installation, and connection of the sensor in accordance with these instructions prior to any use.

The information contained within this manual affects your legal rights, responsibilities, and safety. Failure to read and follow any instructions and warnings contained within this document may result in a serious injury to yourself or others, damage to your Tan Delta Systems product(s), or damage to other objects.

By installing and using your Tan Delta Systems product(s), you are agreeing that you acknowledge and understand this disclaimer and warning.

Tan Delta Systems accepts no liability for damage, injury or any legal responsibilities incurred directly or indirectly from the use of this product. The user shall at all times observe safe and lawful practices including, but not limited to, those set out in this document and any associated reference documents.

AMENDMENT SHEET

Version No.	Amendment	Amended By	Date
2.0	New document	R Vahter	01 May 2023

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1 Introduction

The Tan Delta Mobile Oil Test (MOT) Kit allows you to quickly and easily perform field tests on oil samples to gain immediate insight into your oil condition, without the need for lab analysis. You can build up regular test data from a wide range of assets to easily identify unusual readings associated with contamination or increased oil wear.

The Tan Delta MOT software will provide both qualitative and quantitative feedback for each sample to help you take the appropriate action.
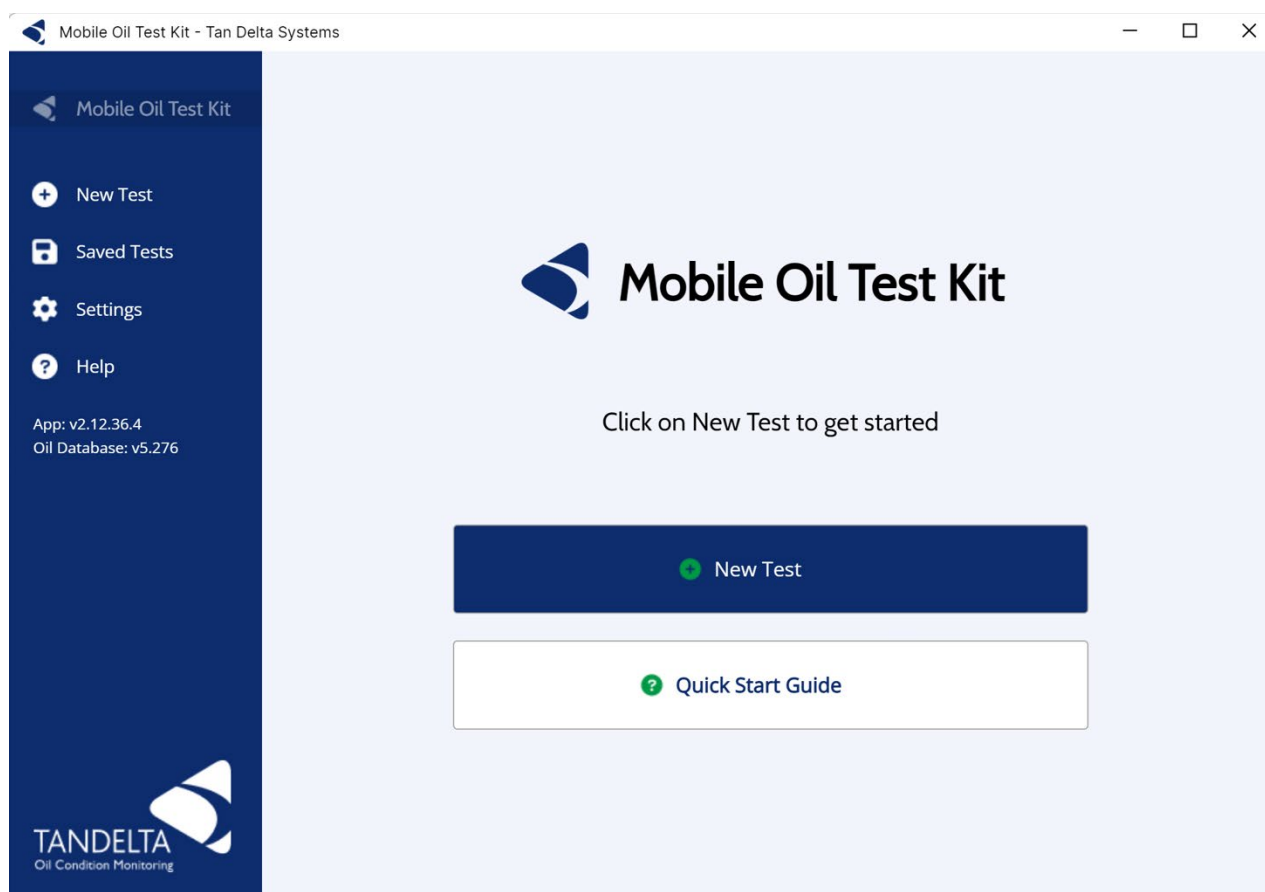
Figure 1 MOT Software

2 Measuring Oil Quality

There are a number of ways to describe oil wear and oil condition. The Tan Delta system offers two methods:

- Tan Delta Number
- Loss Factor Percentage

2.1 Tan Delta Number

The Tan Delta OQSxG2 measures the Tan Delta Number (TDN) which is a scale running from 1200 (upper limit) to 0 (lower limit). New oil will have a value of approximately 0900 and the number will fall as the oil condition deteriorates. You can set warning and alarm levels anywhere on this scale.

When new, the Clean Point for most oils will generally be between 0950 and 0850 on the TDN scale. The actual value will depend on several factors but most importantly how pure the base stock is and what additive packages have been included. During use, as the oil deteriorates, TDN value will decrease.

Oil wear is not linear, it tends to follow an exponential curve, therefore any initial change in wear and/or contamination will tend to be slow, however, as the wear and/or contamination increases, the rate at which the oil degrades will increase.

> **NOTE: The TDN does not start at 1000 for a new, clean oil, as some oils can be improved by using sophisticated on-line or off-line filtration. An oil can also improve on the TDN scale, as well as deteriorate.**

2.2 Loss Factor

A clean oil has a Loss Factor Percentage of approximately 0% and then as the oil changes and degrades this Loss Factor Percentage increases. For most applications, oil would be considered to be degraded at a Loss Factor Percentage of 25% and at the "end of life" at a Loss Factor Percentage of 30% or above.

3 What's in the Box?

When unpacking your MOT kit, please ensure that all the following items are present. If any of the items are missing, please contact your dealer or support@tandeltasystems.com.

3.1 Included in MOT kit

- Tan Delta Oil Quality Sensor
- Tan Delta Sample Bottle Adapter
- Tan Delta Configuration Cable
- USB Memory Stick
- 5 x Clean Bottles
- Loctite 7063© Solvent Cleaner (UK only due to shipping restrictions)

3.2 Additional Items

- Cleaner if not included (Loctite 7063 Recommended)
- Oil Samples – Samples should be shaken to ensure even distribution of contaminants and left for air to dissipate.
- Tissue Paper/Paper Towels
- Nitrile Gloves

4 Installation

4.1 Install Software

4.1.1 Insert Product USB
Insert product USB, this should automatically launch windows explorer to display the files.

4.1.2 Launch Installer
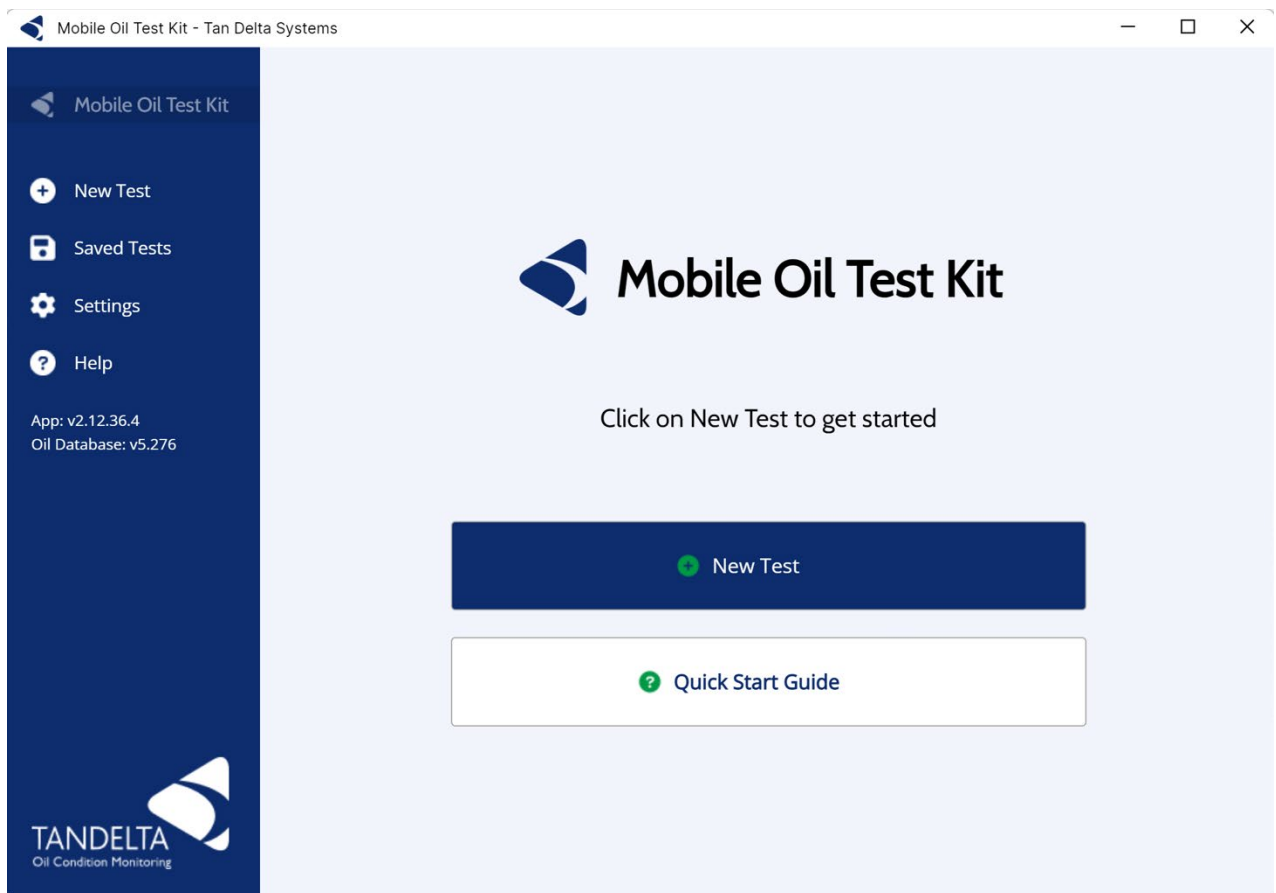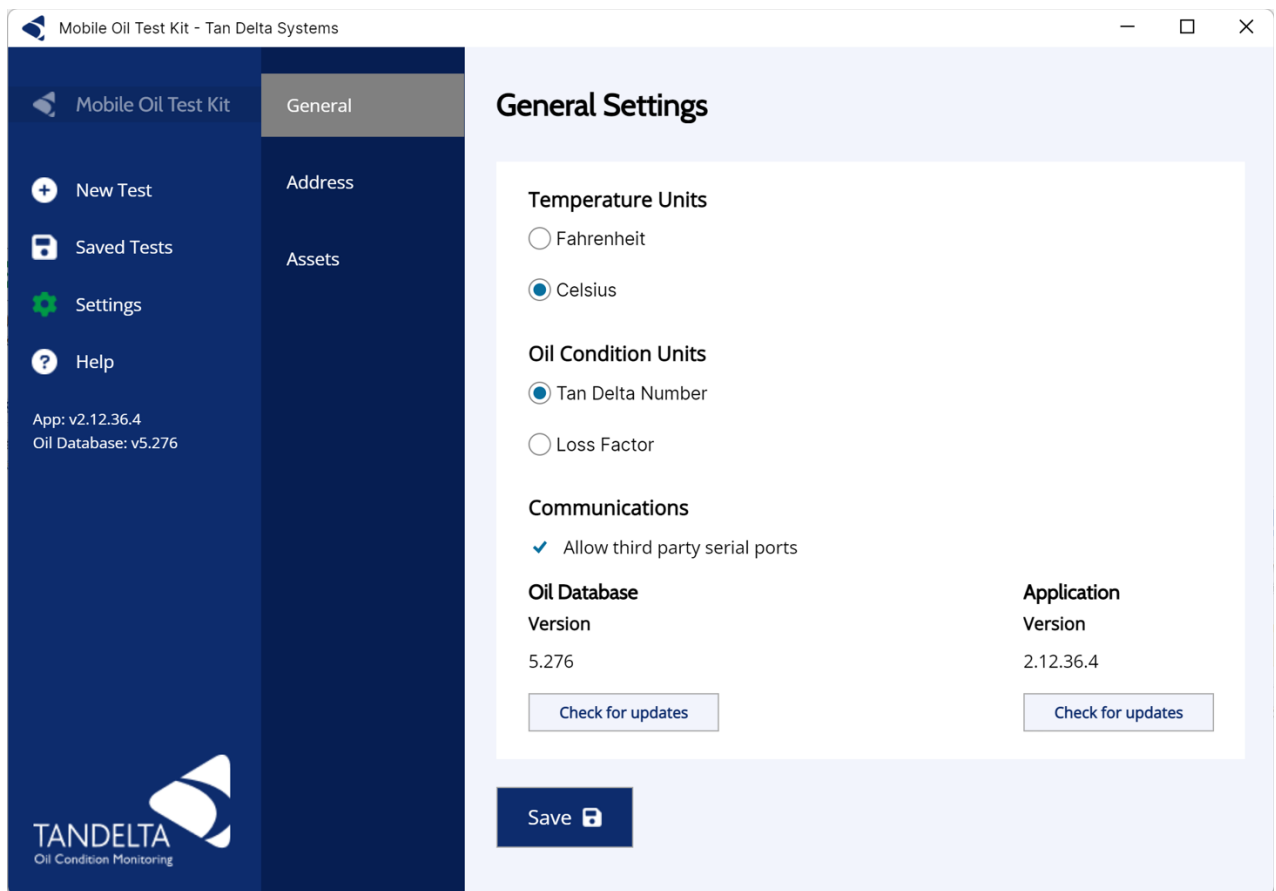Double click the .exe file to launch the installer and follow the on-screen instructions to install the software.

Figure 2 MOT Home Screen

4.1.3 Settings

The settings option in the left hand menu bar can be used to change oil condition or temperature units and load new oil databases.

Figure 3 MOT Settings Screen

5 Take Readings

5.1 Prepare Sample

Take your first sample and connect the bottle adaptor and sensor. Invert the bottle so the sensor tip is submerged in the oil. It may take some time for air bubbles to escape from around the electrode of the sensor, for viscosities under 100 this should take no more than 10 seconds, for higher viscosities this can take some time, some firm taps with the palm of your hand on the bottle adaptor should help dislodge the bubbles.
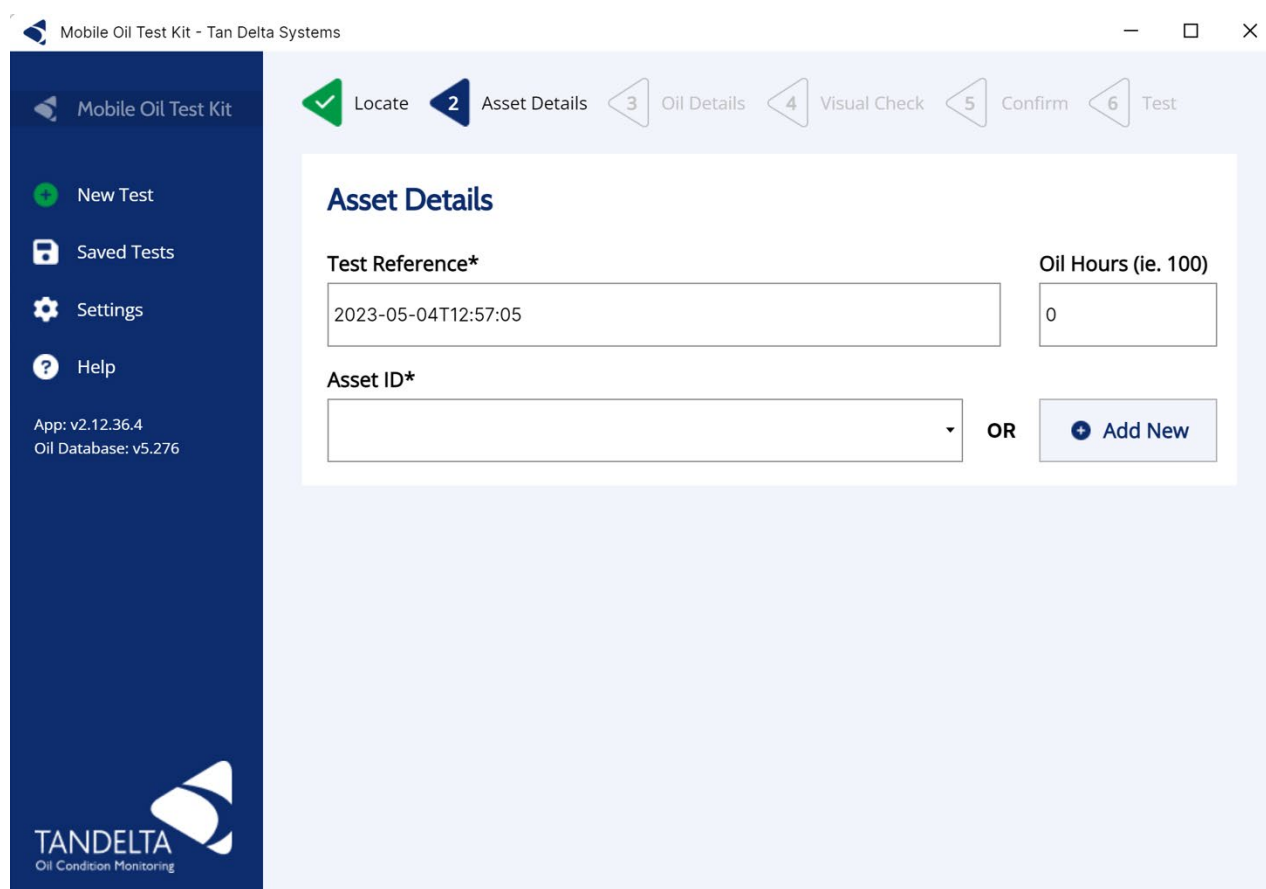
5.2 Asset Details

When carrying out a test, the software will collect asset details to save with the test results and to build a history of tests, stored on the PC that the software is installed onto.

The software can collect the following information:

- Test reference* (You can choose your own, or a default timestamp based reference can be used.)
- Asset ID*
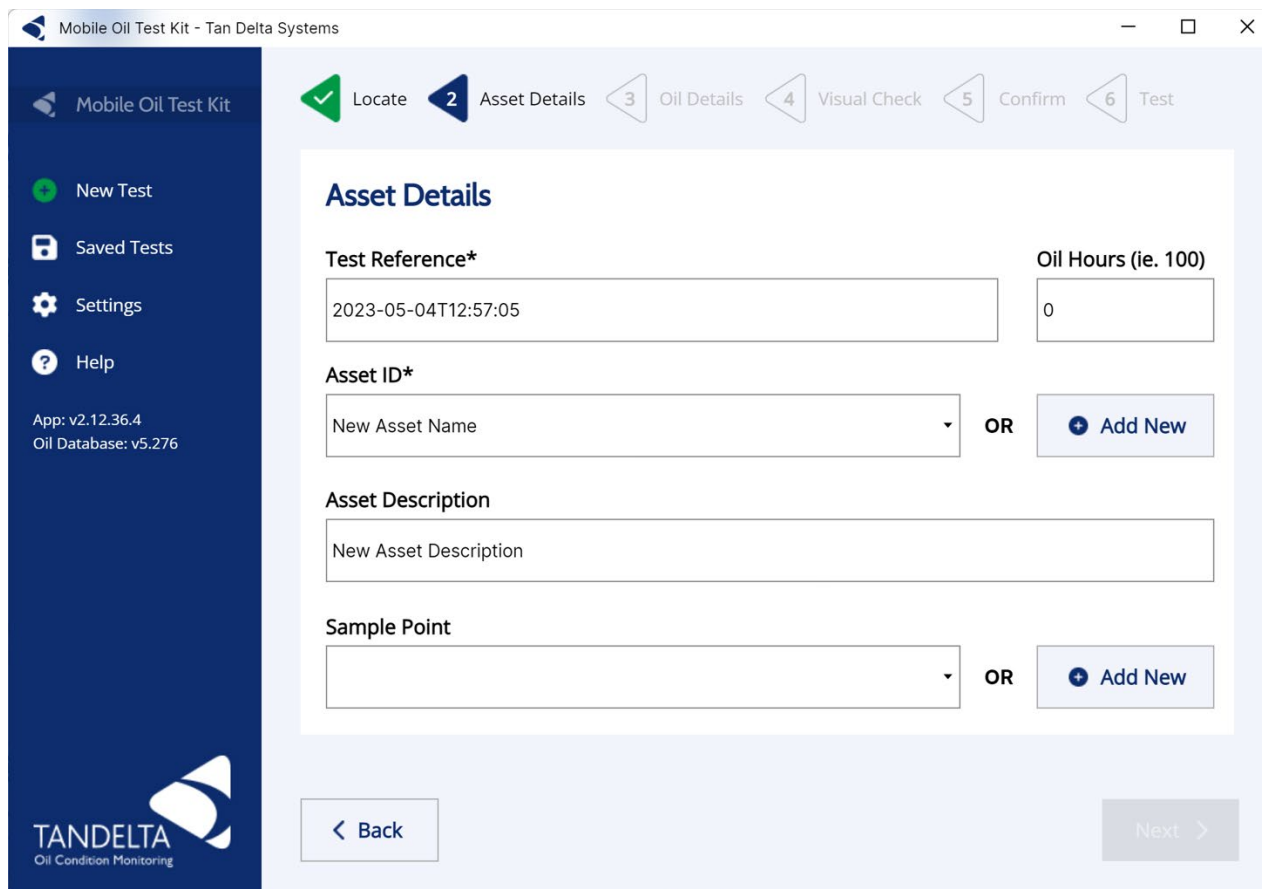- Oil Hours (How many hours the oil has been in use for)

*Test Reference and Asset ID are mandatory fields.

Figure 4 Asset Details (1)

Once an Asset ID is selected, an asset description can be completed and a sample point selected (e.g. Engine)

Figure 5 Asset Details (2)

## 5.3 Select Oil to be Tested
Following asset selection, the oil type must be selected from the oil database.

If the oil you are wishing to test does not appear in the oil database, then the oil will need to be profiled by Tan Delta. Contact support@tandeltasystems.com for assistance.

5.4 Select Visual Rating
Once the oil is selected, you will need to select a visual rating from the following options:
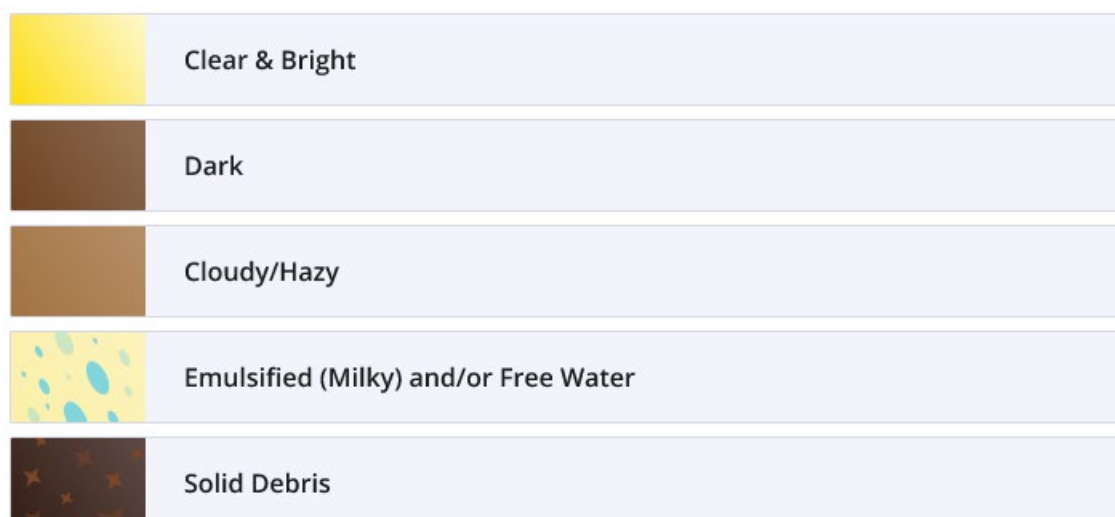
Figure 6 Visual Check Indication

The visual rating serves 2 functions;

1. It accounts for the fact that the MOT kit is for reading static samples, so there is potential for separation, and the sample may not be uniform throughout. For example, you could have free water, which would not touch the sensor tip, however it certainly shouldn't be ignored, so the visual check will account for this. If the sample was shaken to emulsify the water/oil, then the sensor would pick it up and the reading would increase, and so the visual check will account for this. Alternatively, if you have particles large enough to see, then these are not going to be detected by the sensor, but they certainly need to be accounted for.

2. It is widely accepted that a visual check should be completed when taking any oil sample (if your oil is Cloudy, Emulsified, has Free Water or Solid Debris then it probably needs to be changed immediately). The MOT software prompts operators to always do this, and if any of the conditions listed are present the they will be given a warning which should be a call to action. The MOT kit is really designed to be used repeatedly on the same pieces of machinery, to build up a trend of oil condition, from this the operators can identify spurious results which would indicate a problem. The visual descriptions also help with this by giving an additional qualitative data set.

5.5   Confirming Details

Before you click the button to 'Run Test' you should confirm that the details are correct and that the sensor has been cleaned before carrying out the test.

Once you click to 'Run Test' the software will program the sensor and take a reading.

NOTE: If the oil you require is not in the database, please contact support@tandeltasystems.com for assistance.


5.6 Results/Recommended Actions

The software will report the visual and sensor outputs for your sample. The values for the specific outcomes will depend on the application / sample point you selected, but the result screen will provide the following detail:

- Test Result (Oil condition value)
- Remaining Useful Life
- Rate (amount) of change
- Visual Indication
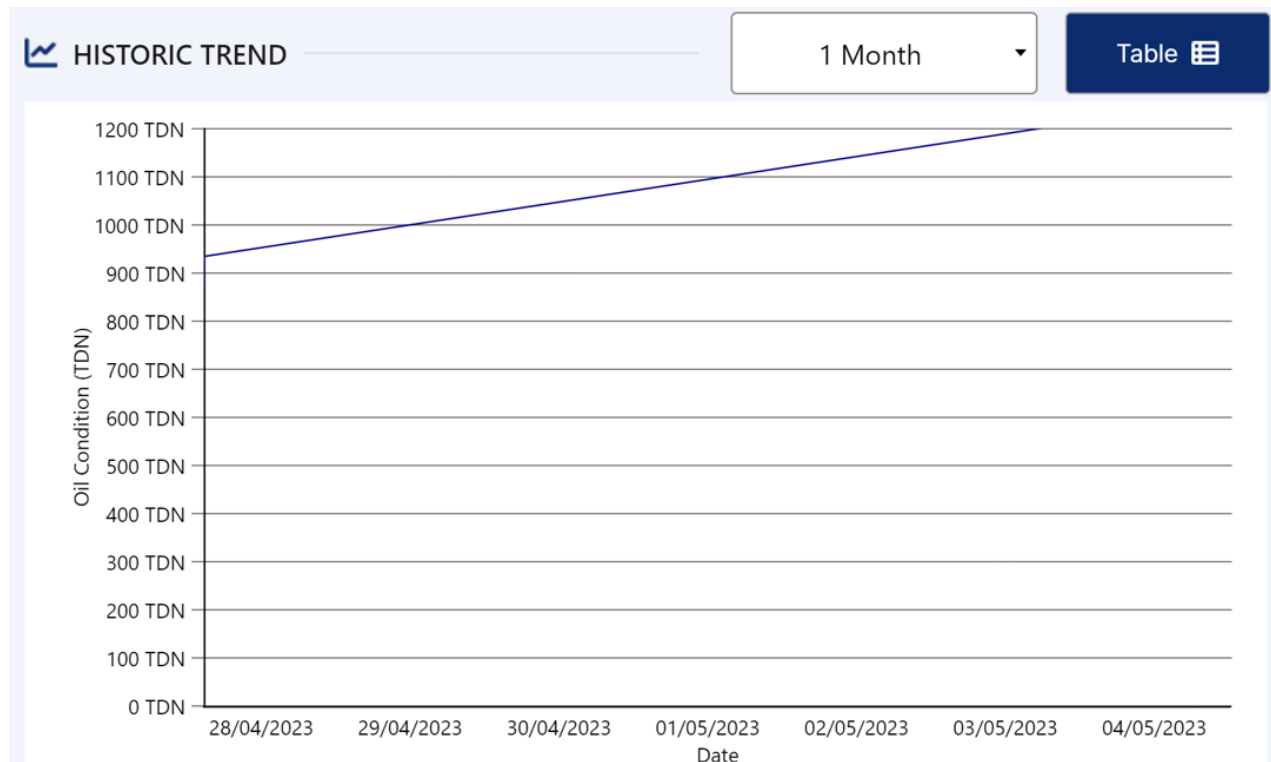- Time to Maintenance
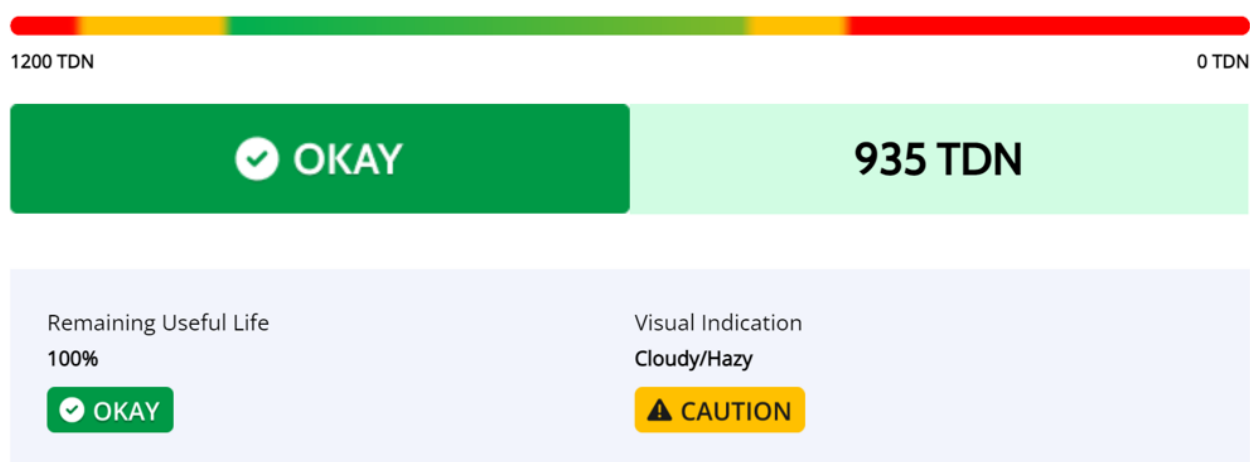
Figure 7 Test Result

The results screen will also provide a written summary including observation and recommendation.

Figure 8 Test Summary

Where the asset has previous tests recorded on the PC used for the test, a historic trend of previous test results will also be displayed. This can be viewed as either a table or a simple graph.
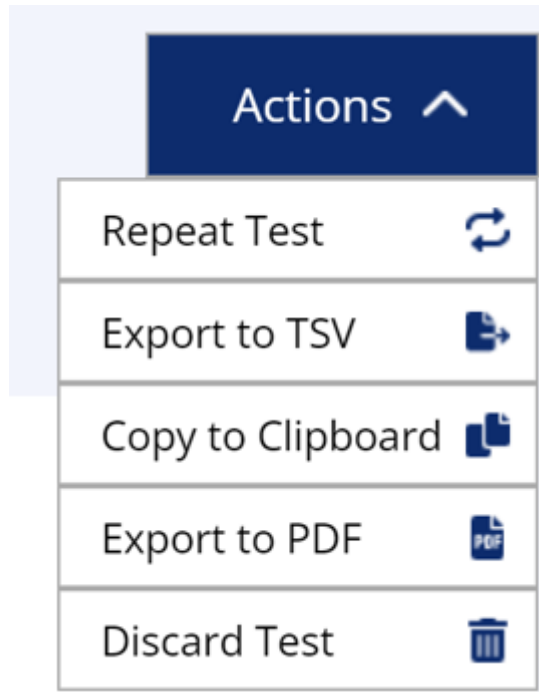
Figure 9 Historic Trend Graph

Date	Time	Oil Condition	Remaining Useful Life	Visual Condition
27/04/2023	14:42	874.7TDN ⊘	96%	✓ OKAY
27/04/2023	14:48	934.9TDN ⊘	100%	✓ OKAY
04/05/2023	12:29	1,261.8TDN ⚠	100%	⚠ ALERT

Figure 10 Historic Trend Table

5.7 Test Result Actions

There are a number of actions then available on the test results screen, to re-rest, copy, export or discard results.

Figure 11 Test Result Actions

5.8 Saved Tests

The software has a repository of saved tests which can be organized by date, result, Asset ID or Test ID. These test results can be opened and the list of actions can be accessed.

Figure 12 Saved Tests

5.9 Help

The help menu allows access to the Quick Start Guide and the user manual in PDF format.

6   Cleaning Sensor

You should always clean the sensor when switching from one sample to another.

Unplug the sensor and remove from the sample, use the tissue to wipe off the excess oil from the sensor tip and thread then follow this cleaning procedure;
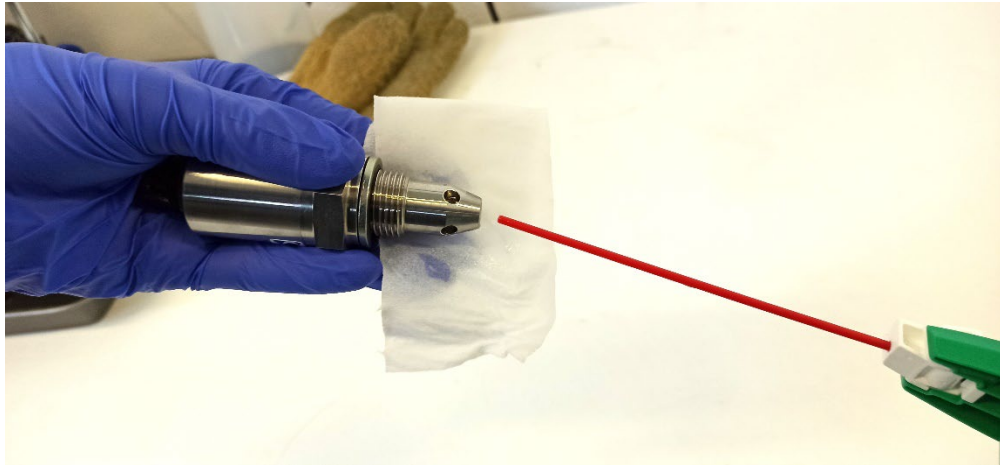
- Turning the sensor around whilst cleaning to force a short blast of solvent up into each of the holes in the nose, and then giving a general exterior wash on both sides as shown in the pictures below
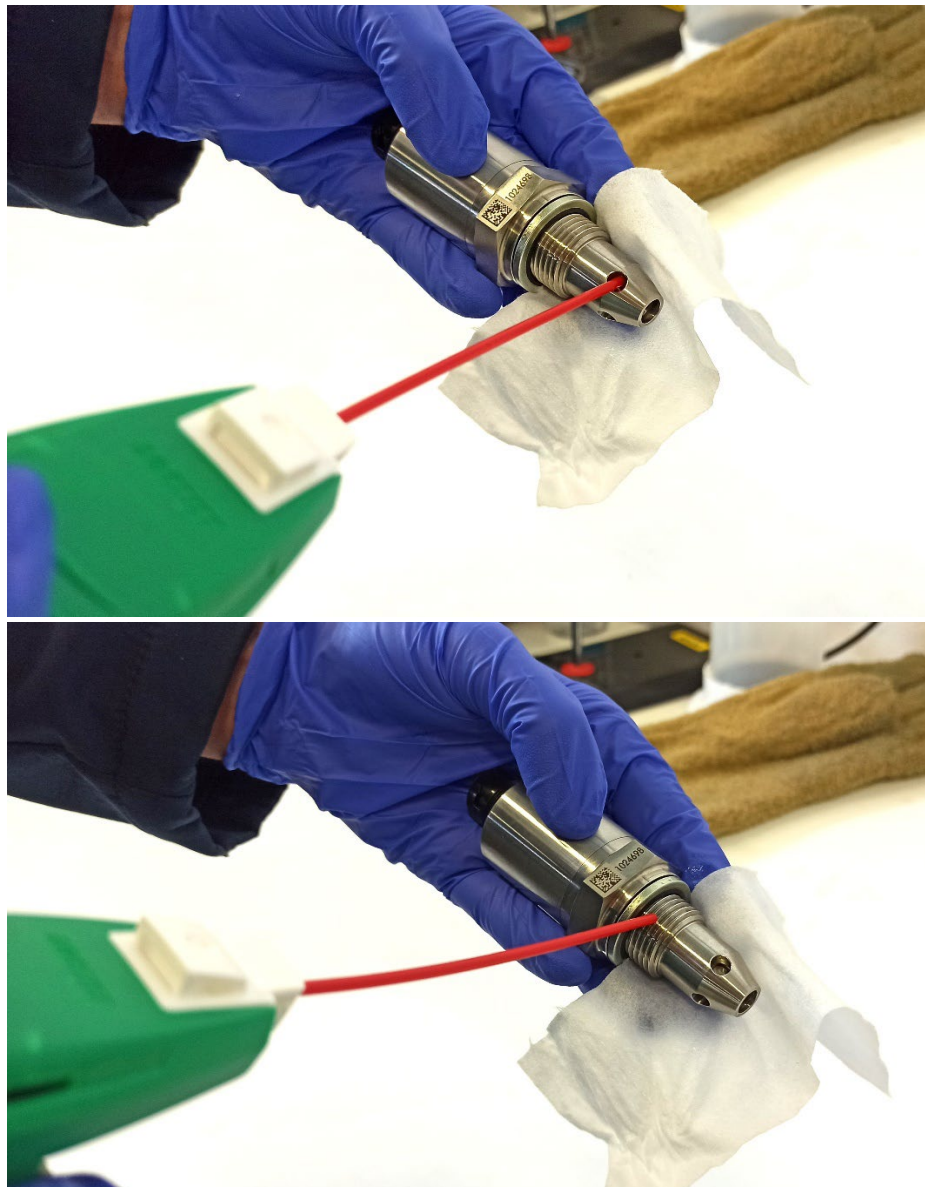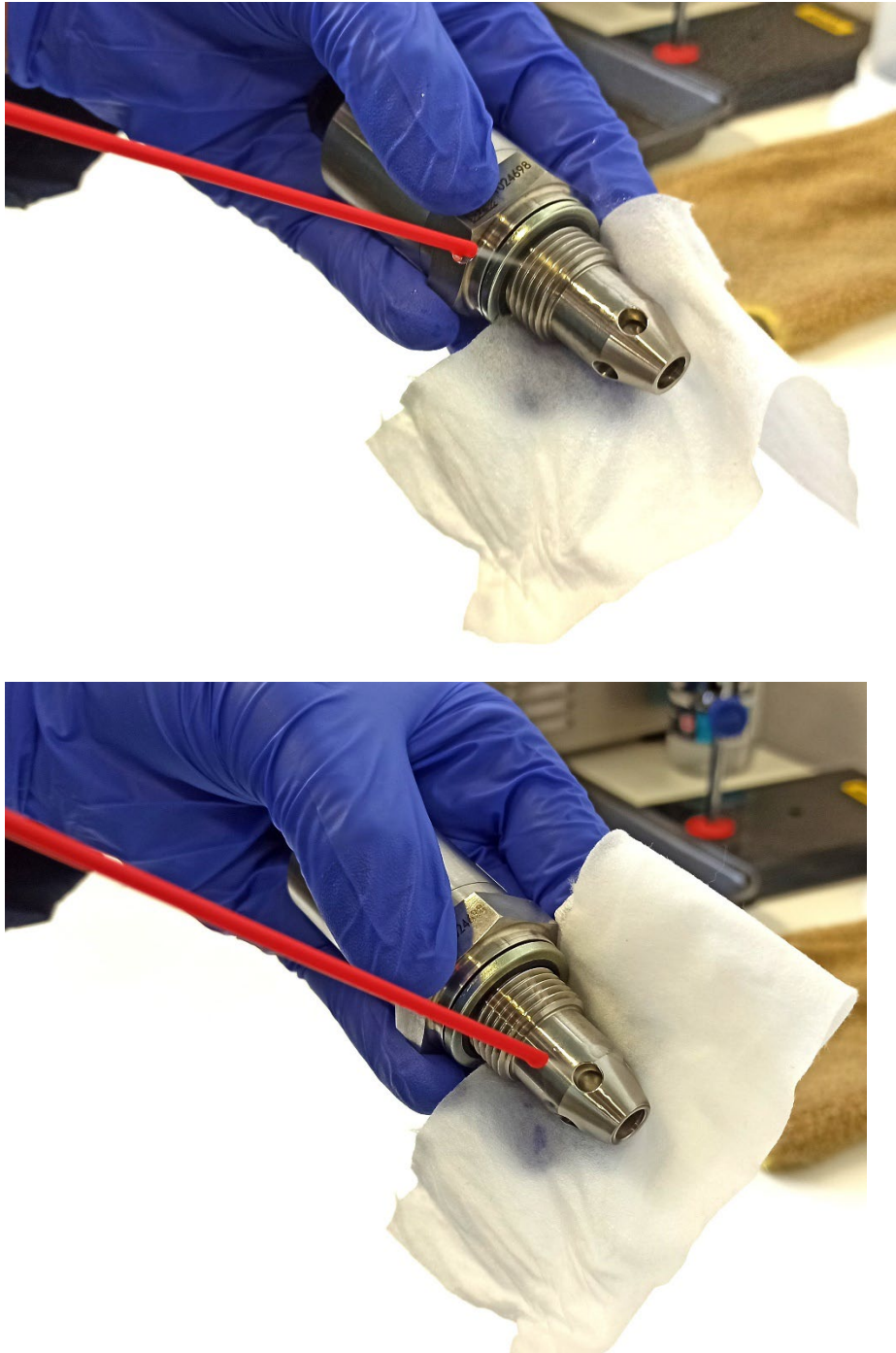
Figure 13 Sensor Cleaning (1)

- Give a slightly longer blast up the centre hole (2 seconds).

Figure 14 Sensor Cleaning (2)

- Give the sensor a quick shake to dislodge any solvent remaining around the electrode.
- Leave to dry for a few minutes