IRON CHECK E - Instructions of use

Measuring Total Iron Content in Cylinder Drain Oil Samples

1. Before starting to prepare solution and oil samples for the test, plug in the cable of the IRON CHECK E and turn on the test device.

   Then select the “MEASUREMENT” mode in the main navigation menu by using arrow keys and press “ENTER”.

►MEASUREMENT ◄
SETTINGS
CALIBRATION
MEMORY

2. The automatic heating process of the test device starts immediately.

   Note: Two chambers A and B of the IRON CHECK E glow red.

The display of the test unit IRON CHECK E shows gradual temperature increase up to the default temperature of 70˚C.

HEATING
S1/3
5 / 70˚C

Important: Please, carefully follow the instructions appearing on the display one after another. The three steps of the measuring process are indicated as **S..../ 3** and displayed in the upper right corner.

As long as the automatic heating process takes place, please prepare reaction liquid

for the test.

Preparation of FE Indicator Solution

The FE Indicator Solution is necessary for dilution of cylinder drain oil samples.

1. For preparing the Indicator Solution, the plastic beaker needs to get filled with 25 ml of distilled water.

2. One full measuring spoon of the FE Indicator powder has to be added to the distilled water in the plastic beaker.

3. With the help of the glass rod, the distilled water and the FE Indicator powder should be thoroughly mixed until clear light-yellow solution is obtained.

Preparation of Reaction Liquid

Once the FE Indicator Solution is ready, preparation of the reaction liquid can now be completed.

1. Fill the glass vial with 10 ml of the TFE Solution. Use the measuring cylinder and funnel for this purpose.

2. Add 5 drops of the prepared FE Indicator Solution from the plastic beaker with the help of a pipette.

3. Close the glass vial with a plastic plug and shake well the obtained reaction liquid.

Automatic Heating and Evaluation Processes with the Test Device IRON CHECK E

1. By the time the reaction liquid is prepared, the automatic heating process of the IRON CHECK E should be completed. The second step in the measuring process **S2/ 3** will be then displayed:

MEASURING S2/3
A: INSERT SAMPLE B: INSERT SAMPLE

Now remove the plastic plug and insert the prepared glass vial into the chambers A and/ or B of the IRON CHECK E as the reaction liquid has to be warmed up separately.

Note: Both chambers A and B of the IRON CHECK E can be used simultaneously in case two or more oil samples have to be tested to determine total iron content. This advantage enables to save time.

2. Once the glass vial is placed into the corresponding chamber of the IRON CHECK E, automatic pre-heating of the reaction liquid starts.

MEASURING S2/3
A: WAIT 600 S B: INSERT SAMPLE

Note: The countdown starts from the pre-set measuring time of 600 s.

The picture above shows an example of using the chamber A of the test device. The chamber B is used in a similar manner.

3. As long as the automatic heating process of the reaction liquid takes place, please prepare oil samples.

Representative cylinder drain oil samples are required for the analysis.

Note: To ensure significant results it is possible to get a sample with VECOM MARINE sample equipment in a sample bottle during the normal operation.

Important: Shake the sampling bottle thoroughly in order to ensure that all particles are homogenously spread in the oil sample.

Draw 0.5 ml of the cylinder drain oil with the help of a syringe.

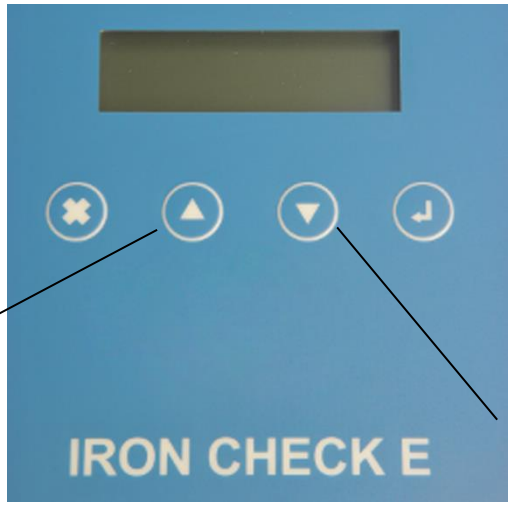
4. As soon as the automatic heating process of the reaction liquid is completed, the following menu will appear on the digital screen of the test device:

MEASURING S2/3
A: INS. OIL → UP B: INSERT SAMPLE

This means that the oil sample can now be added into the glass vial which was placed into the test device for pre-heating of the reaction liquid. The picture shows an example of using the chamber A of the test device. The chamber B is used in a similar manner.

Attention: Please squeeze carefully the oil out of the syringe into the glass vial **<u>without taking the glass vial out of the chamber of the IRON CHECK E.</u>**

Important: After adding the oil sample into the glass vial located in the chamber A of the IRON CHECK E, please press the “UP ARROW KEY” on the control panel of the test device to confirm the beginning of the automatic measurement of the iron content.



UP ARROW KEY
[SELECTION KEY]

DOWN ARROW KEY
[SELECTION KEY]

Once the oil sample is added, chemical reaction occurs and automatic electronic evaluation process of the iron content starts. As the measuring process is fully automatic, no manual intervention is required.

MEASURING S2/3
A: 100 % WAIT 600 S B: INSERT SAMPLE

5. As soon as the measuring process in the chamber A is finished, the determined iron concentration in cylinder drain oil samples will be shown on the display **S2/ 3**:

MEASURING S2/3
A: 150 MG/L FIN
B: INSERT SAMPLE

Attention: If the measuring process is terminated manually by user, the measured value will not be saved. Please, always wait until the IRON CHECK E automatically stops measuring once the actual reaction has been finished. The measured value will be then immediately displayed on the digital screen in mg/l.

6. **Note:** In case two or more oil samples have to be tested, the chamber B of the test device IRON CHECK E can be used in parallel with the chamber A.

For proceeding with the chamber B to test a further sample, please repeat the steps 1-3 and then add the next oil sample into the glass vial located in the chamber B of the IRON CHECK E (step 4), and press the “DOWN ARROW KEY” on the control panel.

MEASURING S2/3
A: INS. OIL → UP
B: INS. OIL → DOWN

When the measurement process is completed, the following menu will appear:

FINISHED S3/3
A: 62 MG/L FIN
B: 53 MG/L FIN

The picture shows an example of using two chambers A and B of the IRON CHECK E.

7. **Note**: To test further samples, please take the glass vials out of the chambers A and B of the IRON CHECK E and press the button “OK [ENTER]” on the control panel of the test device. You will be automatically redirected to the “MEASUREMENT” mode in the main navigation menu:

MEASUREMENT
TO START PRESS ENTER

By pressing the button “OK [ENTER]” on the control panel of the test device, the following menu will appear on the display:

MEASURING S2/3
A: INSERT SAMPLE B: INSERT SAMPLE

Then proceed with the steps 1-5 described above.

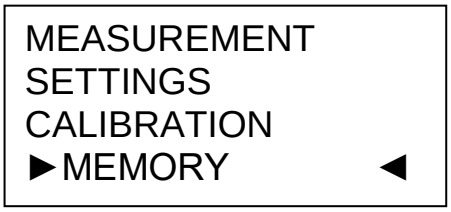
Note: The blue color of the liquids in the glass vials varies in accordance with the iron concentration detected in the cylinder drain oil samples. The darker the hue of the liquid, the higher level of iron content the cylinder lubricant contains.

As an example only, please see the liquids with different shades of blue color which directly depend on the amount of iron concentration in cylinder drain oil samples.

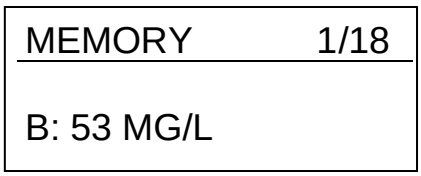
Data Storage of the IRON CHECK E

The measured iron content will be automatically saved on the internal memory chip. The large memory capacity enables storing of 400 measured values. Once the memory is full, the stored data will be automatically overwritten with newly recorded measured values.

1. In order to see the measured values, please select the “MEMORY” mode from the main menu by using arrow keys and press “ENTER”.



2. Navigating through the “MEMORY” mode by using arrow keys select the required measured value, e.g. Channel B, and read the saved value.



Important: Please note that any changes in the mode “SETTINGS” should only be made under supervision as all necessary parameters are pre-set by default as following:

1. Measuring temperature: 70˚C
2. Heat time: 600 s
3. Measuring time: 600 s.

Measuring Corroded Iron in Cylinder Drain Oil Samples

The content of corroded iron in cylinder drain oil samples is measured analogously to total iron content. The only exception is the preparation of the reaction liquid. Instead of using the TFE Solution, please use the distilled water and follow the instructions below.

1. Fill the glass vial with 10 ml of distilled water. Use the measuring cylinder and funnel for this purpose.

2. Add 5 drops of the prepared FE Indicator Solution from the plastic beaker with the help of a pipette.

   (To prepare FE Indicator Solution, please see 5.1 of this instruction manual).

3. Close the glass vial with a plastic plug and shake well the reaction liquid.

After the reaction liquid is ready, please proceed with the step 5.3 (“Automatic Heating and Evaluation Processes with the Test Device IRON CHECK E”) of this instruction manual.

Determining Abrasive Iron in Cylinder Drain Oil Samples

To determine abrasive iron content in cylinder drain oil samples, please use the following formula for calculations:

Total iron measured in the oil sample - corroded iron measured in the same oil sample= abrasive iron

For example, the total iron content measured in the oil sample is 350 mg/l. The content of corroded iron measured in the same oil sample is 100 mg/l.

Total iron (350 mg/l) – corroded iron (100 mg/l) = abrasive iron (250 mg/l)