TOTAL IRON CHECK

Digital Test for Chemical Determination of Total Iron Content (Patent Number: 2982974)

Cylinder condition monitoring of two-stroke marine diesel engines through regular measurement of total iron content in cylinder drain oil (CDO) samples and remaining base number (BN) are of crucial importance to optimize cylinder oil feed rate and to properly lubricate cylinder components in order to provide safe as well as cost-effective engine operation.
The determination of total iron content in CDOs as per recommendation of major engine manufactures is performed by means of the Cylinder Drain Oil (CDO) analysis also called Scrape Down Analysis (SDA).
The amount of total iron present in the CDO provides direct indication of wear and tear of the cylinder components surrounding the engine combustion chamber (pistons, piston rings and cylinder liners). The CDO analysis with on-board digital test device TOTAL IRON CHECK allows accurate monitoring of the trend of total iron content in the CDO in use. The total iron is the combination of two different wear types of engine cylinders:

1. abrasive iron wear (ferromagnetic iron particles);
2. corrosive iron wear or so-called “cold corrosion” (non-magnetic iron salts).

Therefore, the measurement of total iron enables identification of both types of iron wear. The measurement method of the TOTAL IRON CHECK is based on the chemical determination of the total iron content in mg/kg (ppm). A two-chamber measuring system of the TOTAL IRON CHECK enables simultaneous testing of two CDO samples. The representative CDO sample without any pre-treatment is subjected to chemical reaction occurring between the special reaction liquid and the iron in the CDO sample. The TOTAL IRON CHECK identifies, measures and displays all iron particles in the range up to 1100 mg/kg (ppm), independent of the particle size. The measured values will be automatically saved on the internal memory chip. After the automatic measurement the presence of iron in the CDO samples can also be observed visually. The color of the liquid in the test glass vials can get different shades of blue and is directly related to the amount of iron present. The darker the hue of the liquid, the higher level of iron concentration the CDO samples contain.

Examples of Different Total Iron Concentration Measured in cylinder drain oil (CDO) Samples

FEATURES

- Measuring range: 15/20-1100 mg/kg (ppm)
- Measuring temperature: 70 °C
- Measuring time: about 20 min. for two cylinder drain oil (CDO) samples
- Measurement method: illuminance meter with LED source
- Accuracy: +/- 20 mg/kg (ppm) (confirmed repeatability of test results)

BENEFITS

- Precise semi-automatic measurement of total iron content
- Processing of two samples simultaneously (effective time-saving technique)
- Easy-to-read, digital display of test results
- Storage of the measured iron values per cylinder with date and time stamps
- Early warning of abnormal wear processes in case of regular application
- Efficient adjustment of lubrication of crosshead engines

The latest improved version of the test device includes the following advanced features:

1. Upgraded navigation menu with the possibility to create individual named data slots for up to 20 different cylinders units.
2. Large memory capacity: storage of 400 measured values with date and time stamps.
3. USB to serial connection for transfer of test results into a terminal program and further into Excel or similar software.