

# **FUEL CONTROL**

*(Fuel and Lubricant imposed)*

## **Density**

*(Appendix No. 4 of the CIK Technical Regulations)*

### **Preamble**

*The purpose of this test is to measure the relative density of the fuel, fuel/oil mixture and check if it is within the allowable limits.*

### **Recommendations**


*Materials needed to perform this test:*

- ✓ *A hydrometer that covers the range from 0.720 to 0.780.*
- ✓ *A transparent glass container, (at least as big as the hydrometer).*

*Ensure that the glass container and hydrometer are clean*

### **Operating mode**

- *Place the container on a flat and level surface, fill it with the fuel or the mixture to be checked.*
- *Measure the fuel temperature. (15°C recommended)*
  - *The height of the fuel or mixture in the container must be greater than the length of the hydrometer.*
- *Immerse the hydrometer, weighted end down in the fuel or mixture sample.*
  - *Be careful to avoid contact between the hydrometer and the container.*
  - *When the hydrometer is free and stable in the liquid,*
- *Read the value on the graduated scale it must be between 0.720 and 0.780*
- *Record the results on the appropriate document. (IAME FT Series N°07)*

 *Note: Fuel density (petrol and oil) changes with temperature  
Therefore it is recommended to carry out the fuel check at 15°C*

# Dielectric constant

## Preamble

The purpose of this check is to compare the dielectric properties of the fuel and of the fuel/oil mixture in order to determine whether these are within the permitted limits. The calibration and control procedure described complies with the instructions provided by the manufacturer of the "fuel tester" (Digatron)

## Recommendations

Before carrying out any checks:

- o ensure that the device is in good working order
- o Visually check the good condition of the sensor and its connection
- o When the device is powered up,
- o If "LO BAT" is displayed in the upper left corner of the screen then the batteries need to be replaced
- o **Do not use the device if "LOW BAT" is displayed, the measurement may be incorrect**

## Operational modes

### Device Calibration

- Turn on the device and allow it to warm up for at least 15 minutes before carrying out any checks  
**This will allow the internal components to stabilize at their operating temperature**
- Attach the probe to the device. Hold the probe wire and immerse the sensor in the calibration fluid (Cyclohexane (C<sub>6</sub>H<sub>12</sub>)). Previously poured into a clean and suitable container (glass or plastic) such that the sensor is completely immersed.  
**Take care that the sensor is not in contact with the container.**
- Shake the sensor gently to remove air bubbles that may be trapped between the sensor plates and thus distort the measurement.
- **Calibrate the device to the value 0 (see device manual)**
- Remove the sensor from the liquid and blow out the liquid between the plates.
- Record the displayed value on the appropriate document. (IAME FT Series N°07)

### Checking the reference fuel sample.

- Immerse the sensor in the fuel reference sample, previously poured into a clean and suitable container (glass or plastic) in the same way as described above.
- Read the result and save it on the appropriate document (IAME Series FT N°07). The dielectric characteristics of fuel change slightly with temperature. It is therefore important that the temperatures of the calibration fluid and the fuel sample to be checked do not differ more than 5°C.

### Preparation of the reference mixture

### Materials needed to make the mixture:

- A quality graduated transparent glass cylinder with a capacity of 100 ml
- A 10 ml graduated pipette or syringe
- A plastic container of at least 200 ml

Make sure the container is clean.

### Preparation of the reference mixture

- Pour about 50ml of reference fuel into the test tube
  - **Aspirate with the 6ml syringe (quantity of oil necessary for a concentration of 5%) in the can of reference oil (Imposed oil)**
  - Add it to the fuel
  - Top up with fuel up to 100ml
  - Pour the contents into the glass or plastic container and mix everything
- The reference mixture is ready.

### Calibration for control in tanks

- Immerse the sensor in the calibration mixture (reference mixture) such that the sensor is completely immersed.  
**Take care that the sensor is not in contact with the container.**
  - Shake the sensor gently to remove air bubbles that may be trapped between the sensor plates and thus distort the measurement.
  - Read the displayed result and save it on the appropriate document (IAME Series FT N°07)
  - **Calibrate the device to the value "0" (see device manual)**
  - Remove the sensor from the liquid and blow out the liquid between the plates.
- The device is calibrated and operational

### Control in reservoirs

- Immerse the sensor in the tank such that the sensor is completely submerged.
- Shake the sensor gently up and down to remove air bubbles that may be trapped between the sensor plates and thus distort the measurement.  
**Take care that the sensor is not in contact with the walls and especially the bottom of the tank.**
- Read the result on the display.

**The device must display a value between – 5 & + 5**  
**! If this is not the case, the fuel is **non-compliant****

- If the check is non-compliant, in the presence of the driver or his mechanic, carry out the following operations:
- In a clean container of about 200ml, take a sample of fuel from the tank
- Let the fuel sample stabilize at the same temperature as the mixture control sample (Measure the temperatures)

- *Clean the sensor with fast evaporating cleaner and let it dry for at least 20 seconds.*
- *Immerse the sensor in the calibration mixture (reference mixture) such that the sensor is completely immersed.*
- *Take care that the sensor is not in contact with the container.*
- *Recheck the calibration value (Reference mixture) and adjust it if necessary.*
- *Check the calibration value (0)*
  
- *Immerse the sensor in the sample taken, in the same way as described above.*
- *Read the result on the display and show the value*

● *If the display confirms the previous result, the fuel is non-compliant.*

*o An additional density check can be carried out in the same way as done above. (Optional)*

✚ *During a meeting, it is **imperative** to calibrate the device before each control operation.*

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