



### **What does the SKF OilCheck TMEH 1 measure?**

The SKF OilCheck TMEH 1 measures the change of the dielectric constant of oil. As a consequence of contamination (by water, metal particles or dirt particles) and by electrochemical changes (oxidation) that occur in oils, the dielectric constant of the oil changes. This change in dielectric constant can be used as an indication and sometimes a measure of deterioration of oil. The effect of the individual contaminants and electrochemical changes is discussed below.

#### **Water and engine coolant:**

The dielectric constant of a mineral oil is typically 2.1 and the dielectric constant of water is typically around 60, depending on the temperature, which is about a factor 30 higher than the oil. This means that contamination of the oil with water or engine coolant will cause a rapid increase of the dielectric constant of the mixture. Generally a level of 1000 ppm water or higher in oil will lead to a significant increase of the dielectric constant.

#### **Oil oxidation:**

Oil oxidation, or depletion of antioxidant additives, will lead to a gradual increase of the dielectric constant of the oil.

#### **Metal particles:**

Metal particles are conductive and will lead to a strong increase in the dielectric constant. As the metal particles are polar, they will not stay in the oil, but move to the sensor surfaces. This can show as a step-wise (small jumps) increase of the reading during the measurement.

#### **Dust particles:**

Dust particles in oil will lead to an increase in the dielectric constant of the oil. Generally dust levels of ISO 19/16 or higher will lead to a significant increase of the dielectric constant in oil.

#### **Fuel:**

Fuel is difficult to detect because the dielectric constant of petrol or diesel fuel is very close to the dielectric constant of mineral oil. Fuel contamination does normally cause a slight decrease of the dielectric constant and can hence hide other forms of dilution (such as by water).

The increase of dielectric constant is usually not proportional to the degree of oil deterioration. At larger degrees of deterioration and pollution, the dielectric constant will not increase much more.