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Application Note

THE DETERMINATION OF SALT IN CRUDE OILS

This method describes a procedure for the determination of salt in crude oil by means of flame photometry. The method is a very quick one and can be carried out by unskilled operators.
The sample of crude oil is atomised directly into a non-luminous flame where it ionizes at the wavelength characteristic of the metallic salts present in the oil. An optical filter removes light of unwanted wavelengths and the intensity of the light due to sodium is measured by a photodiode. A reading is obtained and compared with the reading of a standard oil containing 8lb of salt per 1000 barrels.

Equipment Required

1. A Digital Flame Photometer
2. Glass beakers

Reagents Required

1. Benzene, technical grade approximately 1 litre.
2. Standard crude oil from the field or area concerned, containing 8lb of salt per 1000 barrels.
3. Deionised Water
4. Kerosene

Procedure

1. Set up Flame Photometer for sodium analysis in accordance with instruction book.
2. Fill a beaker with the standard crude oil containing 8lb of salt/1000 barrels.
3. Dilute the standard crude oil - one part oil to two parts Kerosene.
4. Set instrument to zero using deionised water.
5. Set instrument to 80 using diluted standard crude oil.
6. Take a reading of unknown crude oil. This will be reading A.
7. Re-check zero with deionised water.
8. Take a further reading of unknown crude oil. This will be reading B.
9. Spray benzene through the flame photometer in order to clean the nebuliser.
10. Spray deionised water as a final cleaning cycle.

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Calculation of the Results

Calculate the average reading as follows:

$$S = \frac{A + B}{2}$$

Reporting of the Results

If S<80, report the salt content to be well below the allowable limit.
If S>80 but <100, report the salt content to be close to the maximum allowable limit.
If S>100, report the salt content to be in excess of the allowable limit.