Determination of sulfur in oil and oil products according to GOST R 51947-2002

This standard is the authentic text of the US national standard ASTM D 4294-98 "Petroleum and petroleum products. Determination of sulfur by method of energy-dispersive X-ray fluorescence spectrometry. " Thus, analysis according to ASTM D 4294 implies analysis according to GOST R 51947 and vice versa.

GOST R 51947-2002 establishes a method for determining the mass fraction of sulfur from 0.0150% to 5.00% in diesel fuel, naphtha, kerosene, oil residues, lubricating oil bases, hydraulic oils, jet fuels, crude oils, gasoline (unleaded) and other distillate oil products, such as M-85 and M-100 fuels, containing 85% and 100% methanol.

DESCRIPTION OF THE METHOD:

Analysis according to GOST R 51947 does not require preliminary sample preparation. The sample is placed in the cuvette as it is and covered with foil.
The test sample, placed in a cuvette, is irradiated with the primary radiation of an X-ray tube. The pulse counting rate from the S-Ka X-ray fluorescence is measured. On a sample containing no sulfur (blank), the count rate of background radiation pulses is measured. The net intensity minus the background is calculated. The sulfur content is determined from a calibration curve plotted for the measured sulfur range.

MEASURING RANGE:

The method specifies the determination of the sulfur content in the range from 0.0150% to 5.00%, with the following precision parameters:

Convergence r
Discrepancy between the results of successive tests obtained by the same operator on the same apparatus under constant operating conditions on identical test materials in a long-term operation, if the test method is performed correctly, it can exceed the following values only in one case out of twenty:

r = 0.02894 (X + 0.1691) ,
where X is the mass fraction of sulfur,%.

Reproducibility R
The discrepancy between two separate and independent test results obtained by different operators working in different laboratories on an identical test material in a long-term operation can exceed the following values only in one case out of twenty:

R = 0.1215 (X + 0.05555) ,
where X is the mass fraction of sulfur,%.