

Determination of sulfur in oil and petroleum products according to GOST R 53203-2008

The standard is identical to the ASTM D 2622-05 standard "Determination of sulfur in petroleum products by the standard method of X-ray fluorescence spectrometry with wavelength dispersion" (ASTM D 2622-05 "Standard test method for sulfur in petroleum products by wave length dispersive X-ray fluorescence spectrometry").

The standard specifies a method for determining the total sulfur content in petroleum and petroleum products, which are single-phase and mobile liquids under normal ambient conditions, as well as liquefy upon moderate heating or soluble in hydrocarbon solvents. These products can be diesel fuel, jet fuel, kerosene, other distillate petroleum products, naphtha, residual fuels, lube base oil, hydraulic oil, crude oil, unleaded gasoline, M-85 and M-100 methanol fuels.

DESCRIPTION OF THE METHOD:

No preliminary preparation of samples for analysis is required.

The test sample, placed in a cuvette, is irradiated with the primary radiation of an X-ray tube. The count rate of pulses from S-Ka-X-ray fluorescence radiation and the count rate of background radiation pulses are measured. The sulfur content is determined from a calibration curve plotted for the measured sulfur range.

Compared to other sulfur test methods, the test method of this standard is characterized by high throughput, minimal sample preparation and high precision, and provides sulfur determination over a wide concentration range.

MEASURING RANGE:

The method establishes the determination of the sulfur content in the range from 0.0003% to 5.3%.

The precision of this test method was determined by statistical analysis of the results obtained from three separate interlaboratory studies.

The first interlaboratory study (Case I) included distillates, kerosene, residual oils and crude oils.

The second interlaboratory study (Case II) included a series of 21 gasolines. Neither the M-85 nor the M-100 were turned on.

The third interlaboratory study (Case III) included 16 samples, each of which was low sulfur gasoline and a diesel type sample analyzed in 28 laboratories.

Sulfur concentration ranges, represented by sample sets, and precision are shown in Tables 1 and 2.

Repeatability

Discrepancy between successive test results obtained by the same operator on the same apparatus using identical materials over a long period of time under normal and correct performance test method, may exceed the following values only in one case out of twenty:

Happening	Range,% mass	Repeatability
I	0.006 - 5.3	$0.02651 X^{0.9}$
II	0.0003 - 0.093	$0.00736 (X + 0.0002)^{0.4}$
III	0.0024 - 0.0080	$0.02438 (X + 0.012469)$

where X is the sulfur concentration,% wt.

Reproducibility The

discrepancy between two single and independent test results obtained by different performers in different laboratories using identical materials over a long period of time under the normal and correct performance of the test method can exceed the following values only in one case in twenty:

Happening	Range,% mass,	Reproducibility
I	0.006 - 5.3	$0.0913 X^{0.9}$
II	0.0003 - 0.093	$0.0105 (X + 0.0002)^{0.4}$
III	0.0024 - 0.0080	$0.04795 (X + 0.012469)$

where X is the sulfur concentration,% wt.