HORIBA
Scientific

NEW!

THE MESA-7220V2

X-ray Fluorescence Sulfur/Chlorine-in-Oil Analyzer

- Measure a wide range of different fuel types
- Choose between a single or 8-tray carousel analyzer
- Vacuum based system, no purge gases required
- Maintenance screen to monitor the life of X-ray tube
- ASTM 7220 with PLOQ of 3 ppm sulfur
- Auto Ranging now available

The latest innovation in field measurement of Sulfur and Chlorine

Technology

The MESA-7220V2 measures both sulfur and chlorine in petroleum based products using the Monochromatic EDXRF method. A monochromatic X-ray source is used in order to obtain an ultra-low noise background which affords the best detection limits for both sulfur and chlorine.

The detector window size was increased to collect more fluorescent X-rays and thus achieve lower level ppm values. This provides excellent, repeatable performance at both low and high concentrations of both elements.

By adjusting the angle of the graphite crystal, the excitation beam can be measured to excite sulfur in the sample, increasing sensitivity.

Handles single sample measurements with ease.

Optional 8-tray turntable allows for greater flexibility.

ASTM D7220, D4294, ISO 20847, ISO 13032, ISO 8754 compliant.

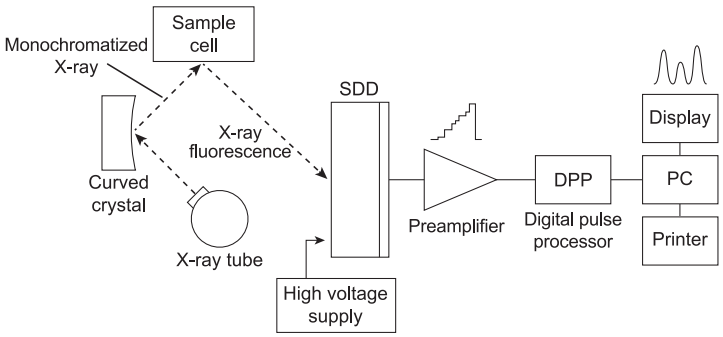
The range for these methods are from 1.0 ppm – Wt% levels.

Key Features

- Dynamic Analysis Range:
  - Sulfur: 0.7 ppm - 10.0Wt%
  - Chlorine: 0.6 ppm - 10.0Wt%
- Auto Ranging for extended curves.
- No purge gases required.
- Maximum 60 calibration curves and 300 data points per curve.
- Calibration curves can be edited after they have been saved.
- Measurement times from 30 – 999 sec.
- Measurement repeats from 1 – 99 times.
- Oxygen correction feature eliminates interference which can affect Sulfur readings.
- Various sample types* [Solids, Liquids, Powders, Pastes, Pellets, and Films] can be measured.
- Can program up to 20 Admin & User accounts.
- User replaceable Kapton window.
- Micrometer adjustment of graphite crystal angle for better sensitivity.
- Stand-alone PC to allow software updates electronically.
- Built-in interlocks to protect end-user from X-rays.
- Silicon Drift Detector/X-ray Beryllium Window.

*Performance is based on petroleum samples.

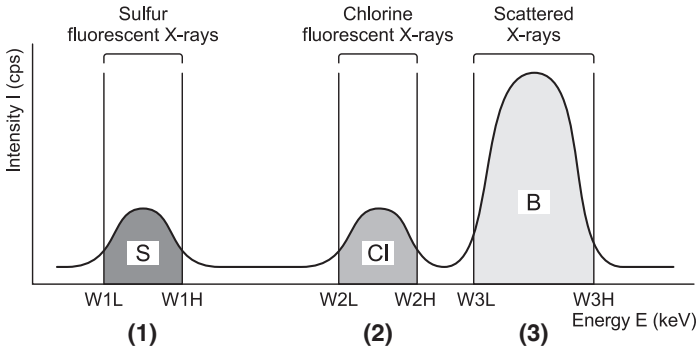
Measuring Principle



Block diagram of measurement principle

When the high-voltage power is sent to the X-ray tube, the primary X-rays are radiated from the X-ray tube to the curved crystal. X-rays irradiated to the curved crystal are monochromatied by the curved crystal and irradiated on the sample cell. Some of the radiated X-rays excite the sulfur and chlorine atoms, generating fluorescent X-rays. These fluorescent and any remaining scattered X-rays are detected by the X-ray detector. In the X-ray detector, electric pulses are generated in proportion to the energy of the incoming X-rays. These electric pulses are strengthened by the pulse amplifier before being sent as a voltage signal to the pulse-height analyzer.

The height values of the pulse output from the amplifier are plotted on the horizontal axis, and the pulse counts detected within the timed interval are plotted on the vertical axis. This plotting results in a spectrum similar to the figure below.



Schematic diagram of spectrum

These measurements are then stored in the PC's memory and used for final calculations.

The energy spectrum has 3 previously specified energy ranges, referred to as windows, which show (1) the window equivalent to the fluorescent X-rays from sulfur (W1L-W1H), (2) the window equivalent to the fluorescent X-rays from chlorine (W2L-W2H), and (3) the window equivalent to the scattered X-rays (W3L-W3H).

The pulse-height analyzer counts the number of electric pulses from the X-rays which come into each window, during a given time, and obtains the integrated values. These values are then converted into a count per second and used in the calculations. The quantities of X-rays which come into the windows are called the quantity of fluorescent X-rays from sulfur, NS (cps), the quantity of fluorescent X-rays from chlorine, NCl (cps), and the quantity of scattered X-rays, NB (cps), respectively.

The analyzer calculates the K value, which is the ratio of NS to NB (K = NS/NB) or NCl to NB (K = NCl/NB) and uses it as the measured value. The determined value (ppm) is read from the K value compared to the calibration curve.

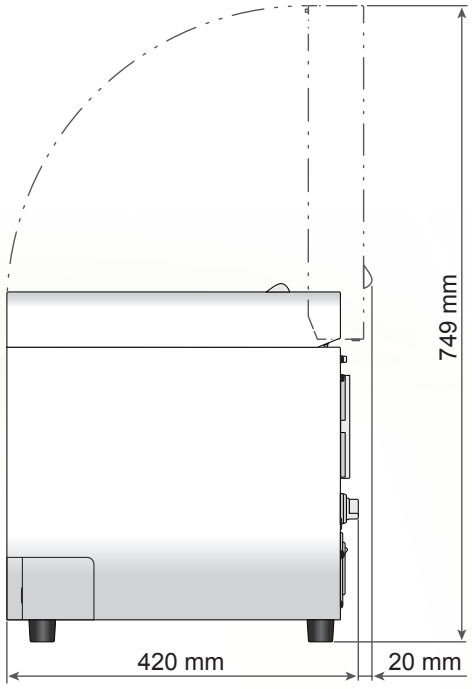
Varieties of Calibration Matrixes

- ULSD
- Diesel
- Biodiesel/Biodiesel blends
- Transformer Oil
- Crude Oil
- #2 Home Heating Oil
- Residual Oil
- Solid Polymers
- Kerosene/Jet Fuel
- Catalyst Samples

Specifications

Instrument Dimensions	Inch	mm
Width	11.69	297
Depth	16.54	420
Height (Closed)	16.54	420
Height (Open)	29.49	749

Instrument Mass
32 kg / 70.55 lb (PC, display monitor, and printer are not included)



Principle	X-ray Fluorescence analysis (Monochromatic EDXRF)
Sample	Petroleum products
Elements to Measure	Sulfur (S) and Chlorine (Cl)
Measurement Range	0.00 – 100,000 ppm
Detection Limit	S: 0.7 ppm Cl: 0.6 ppm
Sample Volume	7 – 10 ml for each sample cell
Sample Chamber	Atmospheric Conditions
X-ray Tube	Ag Target
Detector	Silicone Drift Detector (SDD) Energy resolution at Mn-Kα ≤ 175 eV
Vacuum Level	≤ 4 kPa, Diaphragm Pump
Conformity Standards	ASTM D7220 / D4294 ISO 8754 / 13032 / 20847

PC	
CPU	Intel Core i5-8500 or faster
OS	Microsoft Windows 10 Pro, 64 bit, English (US)
Memory	4GB or more
Storage	1TB or more

Printer	
Model	CT-S4000 made by CITIZEN
Paper / Paper width	Line thermal printer (External) / 112mm / 4.4 inch

Display Unit	
Resolution	Full HD (1920 x 1080)
Panel Size	17 - 23 inch

Please read the operation manual before using any of these products to ensure safe and proper operation.

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