X-RAY FLUORESCENCE SPECTROMETERS & ANALYZERS SPECTROSCAN

solutions for your laboratory

SPECTRON

spectrometers
and analyzers

ABOUT US

SPECTRON NPO Ltd. is ISO 9001:2015 certified

Founded in 1989, SPECTRON remains Russia's leading manufacturer of X-Ray spectrometers and analyzers. The staff of highly qualified engineers, designers, researchers and other experts constantly work on the development and implementation of modern solutions in the field of analytical chemistry.

Our product line includes the range of XRF spectrometers and analyzers; our high technical expertise, constant research for innovative techniques, method implementation support and powerful software help to solve numerous analytical tasks in industry and research.

All instruments supplied are designed and configured in accordance with our clients' specific analytical tasks and are equipped with the necessary accessories, consumables and software.

Today, SPECTRON has supplied over 12 000 instruments for various applications worldwide.

TRAINING AND SUPPORT

SPECTRON has in-home methodical support laboratory and training center.

We are always ready to provide our clients and partners with such solutions as:

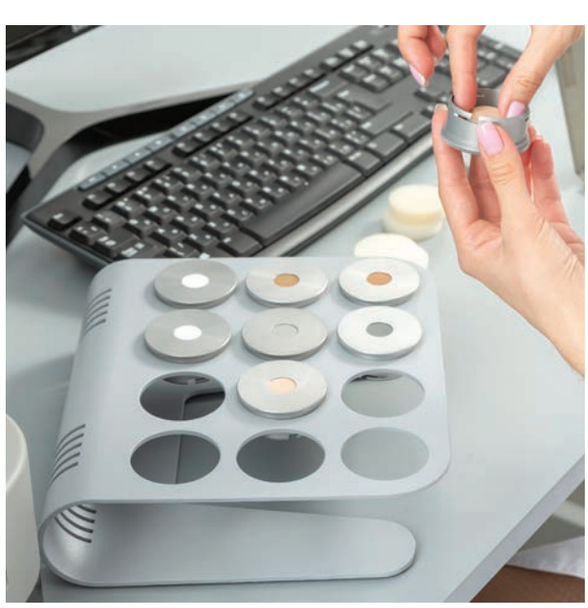
- Development and validation of test methods
- Methodical guidelines development
- Calibration of instruments with customer's samples
- Remote support via the Internet
- Free training on operation, maintenance and service for customers and partners
- Service support within the whole lifetime period

SPECTROSCAN series
Spectrometers & Analyzers

Spectroscan MAKC series X-ray fluorescence (XRF) wavelength-dispersive spectrometers are designed to quantify chemical elements in the range from Na (Sodium) to U (Uranium) in solids, liquids, powders, solutions, thin films and particulate matter deposited on filters.

There are several modifications of Spectroscan MAKC spectrometers available — customers can pick the model with the best price-to-performance ratio according to application.

The distinctive feature of wavelength dispersive X-Ray fluorescence spectrometers (WDXRF) Spectroscan MAKC is its genuine high-aperture X-ray optical scheme.
Due to this scheme excellent sensitivity and high energy resolution (i.e. the ability of spectrometer to distinguish close analytical lines) are achieved in the size of a desktop device.



XRF analyzers Spectroscan are designed to determine sulfur or sulfur and chlorine in petroleum and all kind of petroleum products. There are several energy dispersive (EDXRF) and wavelength dispersive (WDXRF) modifications of Spectroscan analyzers.

All Spectron's XRF spectrometers and analyzers strictly follow IAEA radiation safety regulations.

Software & method implementation

For the most common analytical tasks we provide standard operating procedures (SOP). Delivery sets include all the necessary materials and accessories for analysis and calibration.

All instruments comply with international ASTM and ISO standards.

SPECTROSCAN MAKC-GVM

RELIABILITY. VERSATILITY. SAFETY.

SPECTROSCAN MAKC-GVM provides the quantification of all the elements from ^{11}Na (Sodium) up to ^{92}U (Uranium) in a wide concentration range from the limit of detection up to 100%.

Operation principle of XRF spectrometer is as follows:
A sample is irradiated with primary X-rays generated by X-ray tube. Elements within the sample emit characteristic secondary X-rays (fluorescent X-rays). These X-rays are diffracted on a crystal and a narrow wavelength range is selected. X-rays from the selected range are registered by the detector. Calculation of elements concentration runs using calibration plots that are relations between the known concentration of an element and registered intensity of secondary emission from this element. The spectrometer has high resolution of spectral lines. Due to this accurate determination of elements in samples with a complex multicomponent matrix is possible.

X-ray optical path is within the vacuum chamber while the samples are placed outside it, in ambient environment. It allows analyzing solids, powders and liquids with less sample preparation and conditioning. Such design also protects X-ray optics from contamination in case of damage to the sample's protective film.

Spectroscan MAKC-GVM is equipped with:
160W X-ray tube with side outlet window, a goniometer in vacuum environment, four automatically interchangeable analyzing crystals, two-chambered radiation detector, autosampler and integrated PC with touch-screen.

The desktop size of the instrument provides simplicity and ease of operation, reliability and low running cost.
The whole series of Spectroscan MAKC spectrometers fully comply with IAEA safety regulations. They are not a subject of governmental radiation control.

Applications

- Analysis of geological samples, ores and ore processing products.
- Determination of sulfur, organic chlorine, and heavy metals in petroleum and petroleum products.
- Additives content and wear metals concentration in oils and lubricants.
- Analysis of steels and alloys, and various metallurgical products.
- Ecology and occupational safety: soil, water, working area air.
- Analysis of refractory products, glass, cement and other construction materials.
- Forensic, medical, and criminalistic examinations.
- Materials and Academic research.



Key points

- Quantification of elements from Sodium to Uranium in a single measurement
- No need in He or other gas purge
- Integrated cooling system, no water supply needed
- Built-in PC; user-friendly interface with 8" color touch-screen
- 10 position autosampler
- X-ray optical path inside the vacuum chamber; autosampler in ambient environment. Thus, less sample preparation and conditioning; X-ray optics is better protected from contamination.

Specifications

Elements	Sodium, ^{11}Na to Uranium, ^{92}U	
Limit of Detection, LOD	down to **1 – 5 ppm** (0.0001 – 0.0005%) depending on element, matrix and application	
	^{12}Mg	0.01 – 0.02%
	^{11}Na	0.05 – 0.1%
Limit of Quantification, LOQ	from 3×LOD to 100%	
Resolution	9 eV (Si Kα), 90eV (Fe Kα)	
Method of spectral lines separation	crystal diffraction	
Analyzing crystals	Curved crystals: LiF(200), C(002), PET, KAP (or RbAP) automatic 4 position crystal changer	
X-ray optics	Johansson	
X-ray tube	40 kV, 160 W, Pd-target (other anode materials optionally)	
Detector	sealed Proportional Counter (SDD optionally)	
Sample changer	10 position autosampler; 2 rotating sample holders ambient air environment	
Optical path	vacuum environment	
Cooling	Integrated closed-circuit cooling system water supply not required	
Consumable gases	No	
Interface	Built-in PC with 8″ color touch-screen	
Outputs	RS-232, 2×USB, RJ45	
Power supply	230±23V, 50/60 Hz; 1000 VA max	
Dimensions	Analyzer unit 560 × 460 × 380 Vacuum pump 330 × 230 × 380 mm	
Weight	Analyzer unit 60 kg Vacuum pump 15 kg	

SPECTROSCAN MAKC-G

COMPACT. PRECISE. EASY TO USE.

SPECTROSCAN MAKC-G is designed for quantification of elements from ^{20}Ca (Calcium) to ^{92}U (Uranium) in solids, powders, liquids, thin films and particulate matter deposited on filters.

SPECTROSCAN MAKC-G is the basic model of WDXRF spectrometers. It has an option to add one or two energy dispersive channels to determinate elements in the range from ^{12}Mg (Magnesium) to ^{19}K (Potassium) – models SPECTROSCAN MAKC-GF1E and GF2E.

• Non-destructive analysis – all elements from Ca to U are determined in a single measurement. Energy dispersive (EDXRF) channels enable the determination of one or two elements in the range from Mg to K.

• Desk-top instrument doesn't require water supply and consumable gases.
The spectrometer is adapted for mobile laboratories applications.

• Helium purge is not required for the sample chamber. All the samples including liquids and powders can be installed directly, without pre-treatment.

• Spectrum scanning and high resolution of analyzing crystals exclude the overlapping of close lines of different elements, thus providing excellent background correction without sophisticated calculations and post-processing of data.

• 10 position autosampler reduces laboratory staff workload.

• Spectrometers are delivered pre-calibrated for customer's analytical tasks and equipped with the set of needed accessories.
There is an option to supply sample preparation equipment.

Specifications

Elements WDXRF EDXRF (optionally)	 Calcium, ^{20}Ca to Uranium, ^{92}U 1 or 2 elements in the range from ^{12}Mg to ^{19}K
Resolution	60eV (Fe Kα)
Method of spectral lines separation	crystal diffraction EDX channels with filters (optionally)
Analyzing crystals	Curved crystal: LiF(200) or C(002)
X-ray optics	Johansson
X-ray tube	40 kV, 4 W, Ag or Mo target
Detector	sealed Proportional Counter
Sample changer	10 position autosampler ambient air environment
Optical path	ambient air environment
Cooling	Integrated closed-circuit cooling system water supply not required
Consumable gases	No
Interface	LCD and washable membrane keypad
Outputs	RS-232
Power supply	230±23V, 50/60 Hz, 100VA
Dimensions	405 × 400 × 380 mm
Weight	25 kg

SPECTROSCAN SE

Energy dispersive X-ray fluorescence (EDXRF) Sulfur Analyzer for petroleum and petroleum products

- Unique analytical performance for portable EDXRF analyzer
- The best choice for testing low-sulfur fuels
- Measurement range from 5 ppm to 5%
- Outstanding LOD for EDXRF: 1.5 ppm

EDXRF sulfur analyzer SPECTROSCAN SE is designed for Sulfur determination in all kinds of petroleum samples: from high-sulfur crude to the best grade gasoline.
Spectroscan SE fully complies with ASTM D4294, ISO 20847, ISO 8754, and IP 336 standards.

Features and Advantages

- No Helium purge
- LOD is 1.5 ppm
- Constant self-check, zero and span correction
- Easy operation, no installation requirements
- Suitable for mobile laboratory
- Ultra close position of sample to X-ray optics provides the superior sensitivity
- Special ventilated sample cups for volatile petroleum products

Due to lateral sampler and vertical positioning of sample cup window:

- Errors due to sample inhomogeneity (e.g. water and air bubbles in sample) are excluded.
- X-ray optics is protected from accidental sample spills/leaks.
- No need for additional protection film and no errors from film contamination and non-uniformity.
- Sample compartment can be easily removed and cleaned.

Spectroscan SE is a desktop compact EDXRF with built-in PC, color touch-screen and thermal printer.

There are several in-memory calibrations for ASTM and ISO standards and up to several hundred user calibrations can be recorded in the instrument's memory.
Calibrations and measurement results are displayed in graphical and table forms.

Spectroscan SE has several outputs for PC connection both for data transfer and for remote assistance of Spectron engineers.

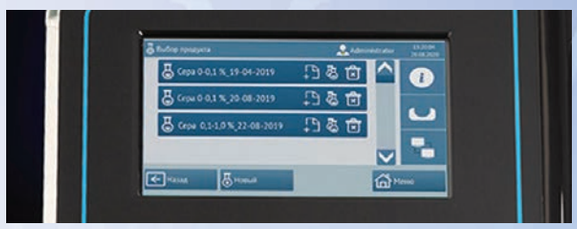
Measurement procedure

Requires just a few simple actions

- enter the sample's name (or number) via the touch-screen;
- pour two portions of the same sample into sample cups;
- measure them one after another

All remaining operations run automatically

- sulfur content in the sample is calculated, displayed on the screen, printed out and integrated into LIMS (option);
- repeatability report – the difference between readings of the first and the second portions of the sample is calculated



Specifications

Elements	Sulfur, ^{16}S
Measurement principle	Energy dispersive X-ray fluorescence (EDXRF)
Limit of Detection, LOD, at 200s	1.5 ppm
Measurement range	5 ppm — 5.0%
Standards compliance	ASTM D4294, ISO 20847, ISO 8754, IP 336
X-ray tube	5 kV, 5.0 W, Ag target
Detector	sealed Proportional Counter
Sample compartment	1 sample, vertically placed
Sample cups	Ventilated sample cup, 8 mL
Measurement time	10 – 999 s, user-selectable
Consumable gases	No
Interface	Built-in PC with 7″ color touch-screen and printer
Outputs	Ethernet (RJ45), USB memory stick, RS-232, Optional LIMS integration
Power requirements	230±23V, 50/60 Hz, 100 VA
Dimensions	400 × 320 × 185 mm
Weight	8.5 kg

SPECTROSCAN SW-D3

Wavelength dispersive X-ray fluorescence (WDXRF)
Sulfur Analyzer

SPECTROSCAN SW-D3 is a perfect tool for precise Sulfur determination in a broad range of applications:
- ultra-low sulfur concentrations in diesel, gasoline and other distillate fuels
- crudes and used oils with high sulfur content
- oil and oil products analysis using Spectroscan SW-D3 fully comply with ASTM D2622, ASTM D6334, and ISO 20884 standards

Features and Advantages

- Best real-life LOD – 0.15 ppm
- No Helium purge
- No external cooling
- Easy operation, quick accurate results
- Outstanding long-term stability
- Ultra close position of sample to X-ray optics provides the superior sensitivity
- Special ventilated sample cups for volatile petroleum products

Due to lateral sampler and vertical positioning of sample cup window:
- Errors due to sample inhomogeneity (e.g. water and air bubbles in sample) are excluded.
- X-ray optics is protected from accidental sample spills/leaks.
- No need for additional protection film and no errors from film contamination and non-uniformity.
- Sample compartment can be easily removed and cleaned.

Measurement procedure

Requires just a few simple actions

- enter the sample's name (or number) via the membrane keyboard;
- pour two portions of the same sample into sample cups;
- put these cups and control sample in the sample compartment and start the measurement»

All remaining operations run automatically

- sulfur content in the sample is calculated, displayed on the screen, and printed out;
- repeatability report – the difference between readings of the first and the second portions of the sample is calculated

Specifications

Elements	Sulfur, ^{16}S
Limit of Detection, LOD, at 300s	0.15 ppm
Measurement range	1 ppm — 10.0%
Measurement principle	Wavelength dispersive X-ray fluorescence (WDXRF)
Standards compliance	ASTM D2622, ASTM D6334, ISO 20884
X-ray tube	40 kV, 160 W, Cr target
Analyzing crystal	C(002) Graphite
Detector	sealed Proportional Counter
Sample changer	autosampler for 3 sample cups, vertically placed
Sample cups	Ventilated sample cup, 8 mL
Measurement time	approx. 8 min for two replicates, user-selectable
Consumable gases	No
Interface	Built-in LCD with washable membrane keypad and printer
Outputs	USB
Power requirements	230±23V, 50/60 Hz, 750 VA max
Dimensions	Analyzer unit: 530 × 480 × 340 mm Vacuum pump: 330 × 230 × 380 mm
Weight	Analyzer unit: 40 kg Vacuum pump: 15 kg

SPECTROSCAN CLSW

Wavelength dispersive X-ray fluorescence (WDXRF)
Chlorine and Sulfur Analyzer

The precision complies with ASTM D4929

Spectroscan CLSW analyzer applications:
– Organic chloride content determination in crude oil. As in ASTM D4929–19 Procedure C the determination of organic chloride is made by X-ray fluorescence spectrometry in the washed naphtha fraction of crude oil cut at 204°C. As a difference with this procedure internal standard of Bi is added to reduce matrix effect.
– Total chlorine content determination in petroleum products. The precision complies with that of ASTM D7536.
– Organic chloride content determination in oilfield liquids and aqueous solutions.
– Sulfur content determination from ultra-low in petroleum distillates to high in crude oil. Sulfur determination fully complies with ASTM D2622, ASTM D6334, ISO 20884 standards.

Features and Advantages

- LOD for Chlorine 0.2 ppm
- LOD for Sulfur 0.3 ppm
- No Helium purge
- No external cooling
- Easy operation, outstanding long-term stability
- Widest measurement range in the class
- Ultra close position of sample to X-ray optics provides the superior sensitivity
- Special ventilated sample cups for volatile petroleum products

Due to lateral sampler and vertical positioning of sample cup window:
- Errors due to sample inhomogeneity (e.g. water and air bubbles in sample) are excluded.
- X-ray optics is protected from accidental sample spills/leaks.
- No need for additional protection film and no errors from film contamination and non-uniformity.
- Sample compartment can be easily removed and cleaned.

Measurement procedure

Requires just a few simple actions

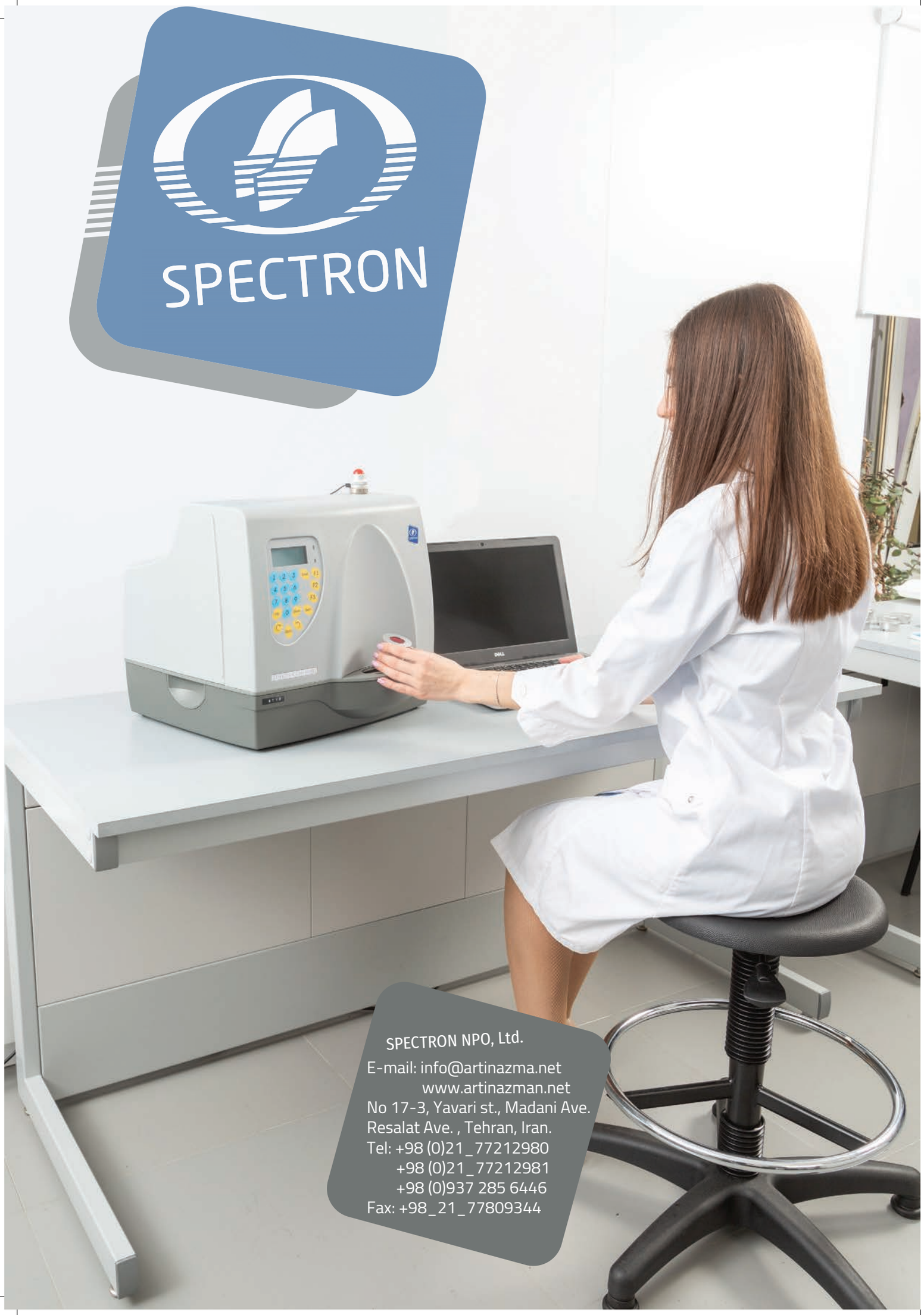
- enter the sample's name (or number) via the membrane keyboard;
- pour two portions of the same sample into sample cups;
- put these cups and control sample in the sample compartment and start the measurement»

All remaining operations run automatically

- sulfur content in the sample is calculated, displayed on the screen, and printed out;
- repeatability report – the difference between readings of the first and the second portions of the sample is calculated

Specifications

Elements	Chlorine, ^{17}Cl	Sulfur, ^{16}S
Limit of Detection, LOD, at 100s	0.2 ppm	0.3 ppm
Measurement range	0.5 ppm – 1.0%	1.0 ppm – 5.0%
Measurement principle	Wavelength dispersive X-ray fluorescence (WDXRF)	
Standards compliance	ASTM D2622, ASTM D6334, ISO 20884 The precision complies with ASTM D4929 procedure C	
X-ray tube	40 kV, 160 W, Ti or Cr target	
Analyzing crystal	C(002) Graphite	
Detector	sealed Proportional Counter	
Sample changer	autosampler for 3 sample cups, vertically placed	
Sample cups	Ventilated sample cup, 8 mL	
Measurement time	approx. 8 min for two replicates, user-selectable	
Consumable gases	No	
Interface	Built-in LCD with washable membrane keypad and printer	
Outputs	USB	
Power requirements	230±23V, 50/60 Hz, 750 VA max	
Dimensions	Analyzer unit: 530 × 480 × 340 mm Vacuum pump: 330 × 230 × 380 mm	
Weight	Analyzer unit: 40 kg Vacuum pump: 15 kg	



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