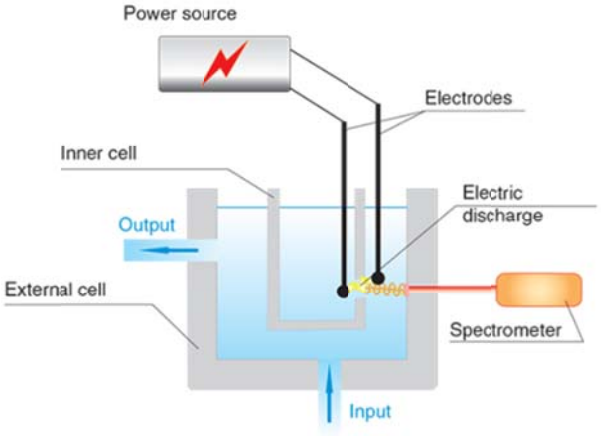
Application Note:

Local Electric Discharge in Liquid as a Source of Atomization and Excitation or Atomic Emission Spectroscopy

- **On-line flow analysis in aquatic environments**
- **Simultaneous determination of different chemical elements**
- **No sample preparation and additional reagents**

The company Bourevestnik Inc. from St Petersburg, Russia, developed the EMIS-2. In cooperation with our Russian distributor Vladimir Lozovskiy (Lokamed) they made this analyzer for water.
The analyzer operation principle is based on the atomic emission method of chemical elements determined using a local electric discharge in the analyzed liquid, followed by the recording and processing of the emission spectra. The intensity of the radiation emission lines of an element is proportional to its mass concentration in the analyzed liquid.



Technical data

Chemical elements determined	Ca, Mg, Na, K, Al, Ag, Cu, Zn, Mn, Li, Sr, Ba, Ni, Fe, Pb, Cd and others
Detection limit depends on the element analyzed and the object matrix	from 0.005 mg/dm^3
Maximum permissible relative error for measurement of mass concentration, depending on the element analyzed and the object matrix	from 15 %
Average time of one measurement in a flow system	50 sec
Spectral range depending on the set of analyzed elements	200 – 800 nm
Water flow (sample) in the flow cell, max.	0.7 l/h
Mains voltage (50 Hz)	220 V
Power consumption, max.	500 VA
Overall dimensions (L x W x H)	600 x 460 x 360 mm
Weight, max.	50 kg

Distinctive features

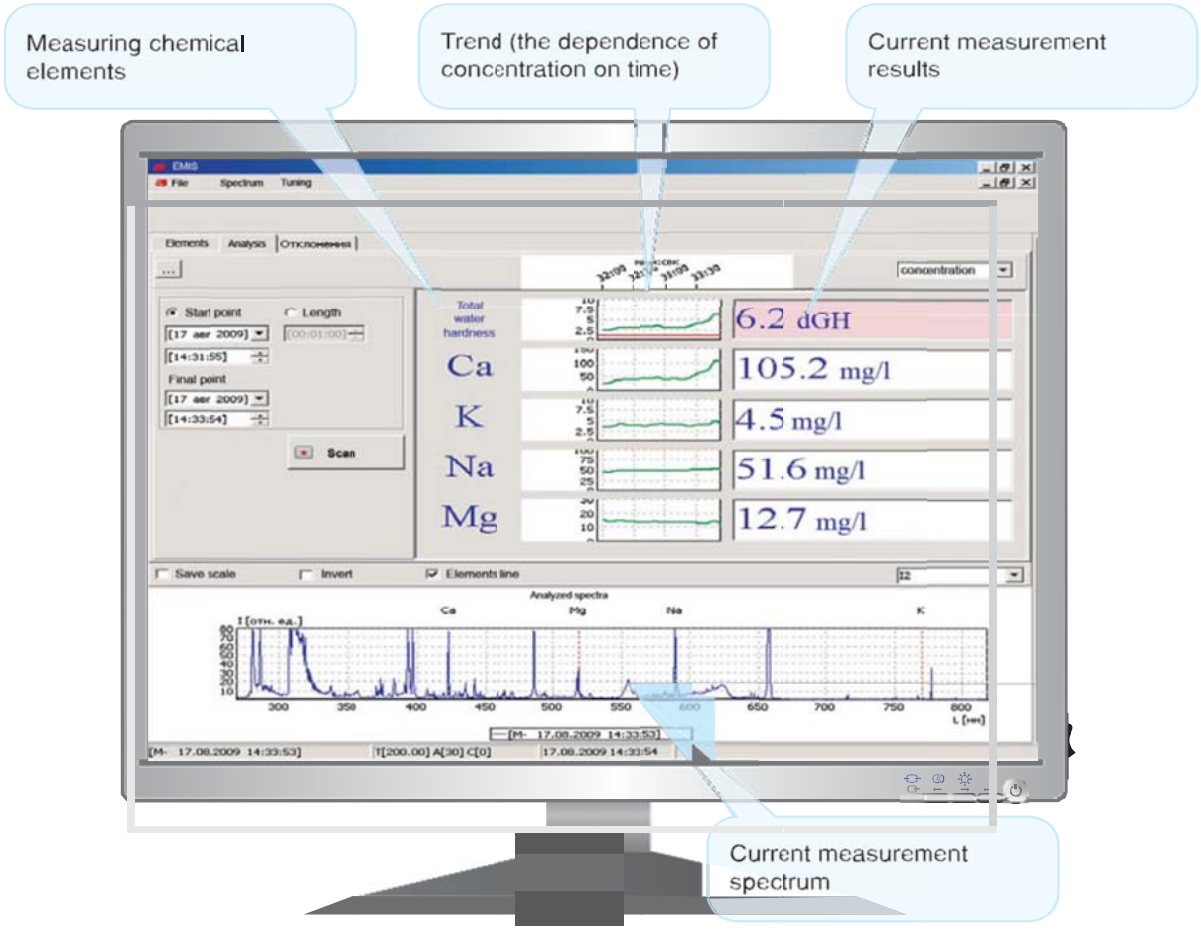
- On-line water flow composition monitoring;
- Simultaneous determination of several components for a single measuring cycle;
- No sample preparation for natural, drinking water and treated wastewater;
- Ability to collect analytical dates from different monitoring points under the control of a single center;
- No specific requirements for workplace organization (gas supply, ventilation, etc.);
- Easy analyzer maintenance and control.

Scope of application

- Water treatment systems for water utilities of settlements;
- Nuclear, thermal energy and chemical industry (including direct and recycled water hardness control in the cooling circuits of nuclear reactors and various steam-powered electric power plants, heating and cooling systems, heat exchangers, etc.);
- In the technological process of the food industry (production of alcoholic and non-alcoholic drinks, baby food, dairy products, etc.);
- Environmental monitoring of the environment (natural, fresh and sea water, treated wastewater);
- Water hardness control in desalination plants, etc.

Information readout

Analysis results are readout in real time on the integrated display and transmitted to the central control panel by Internet. Analyzer software interface “EMIS-2” allows evaluating chemical composition of the analyzed water in visual form.



Avantes spectrometer equipment used in this application:

AvaSpec ULSi 3648 USB (205-368 nm) Grating UD	OEM integrated ultra-low stray-light optical bench, 75 mm focal length, 3648 pixel CCD detector, grating UD, wavelength range 205 – 368 nm
AvaSpec ULSi 3648 USB (365-620 nm) Grating VC	OEM integrated ultra-low stray-light optical bench, 75 mm focal length, 3648 pixel CCD detector, grating VC, wavelength range 365 – 620 nm
AvaGigE	USB to Ethernet converter with controlling software