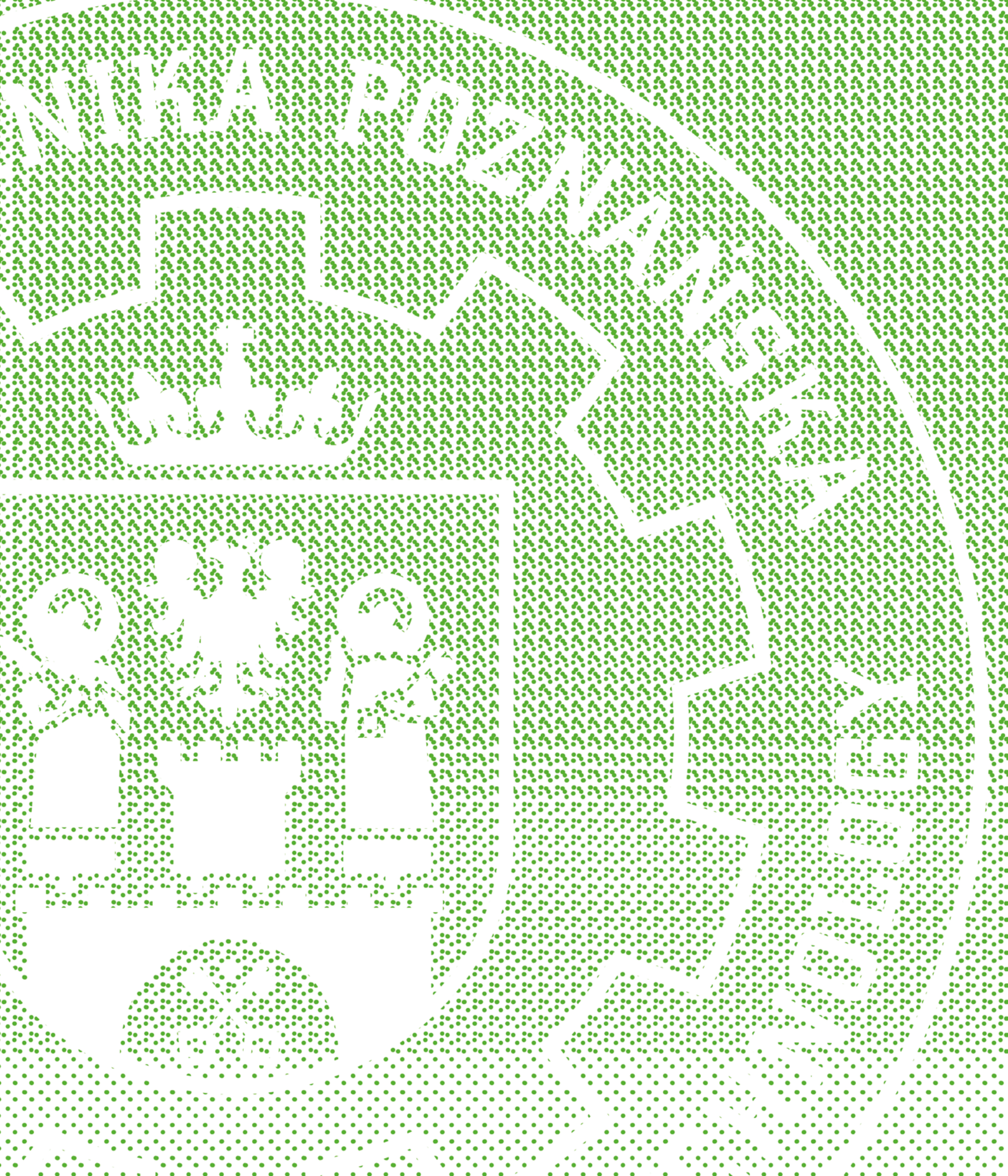


A close-up photograph of a microscope. The objective lens is positioned above a small, light-colored rectangular sample on the stage. The lens has markings: 'NA 0.1', 'WD 35', and 'AZ P'. The number '71' is visible on the side of the lens assembly. The background is a solid blue color.

Promotional catalogue
of apparatus and laboratories of Poznan University of Technology

FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING

Information on the selected test equipment at the Faculty of Civil
and Environmental Engineering, Poznan University of Technology



The Faculty of Civil and Environmental Engineering belongs to the largest and oldest faculties of Poznan University of Technology. Its research activities were and are closely related to the current and prospective needs of global civil and environmental engineering. Competent and experienced academics who are well versed with the latest scientific advances, work in well-equipped laboratories and keep up with the current dynamics of the changing times. The research equipment presented in the catalog is only a part of the research capabilities of the Faculty, which include: construction elements and structures, construction technology and organization, strength of materials, building information modelling (BIM), materials science and concrete technology, geotechnics and geology, geodesy, road construction, bridges and railways construction, heating, energy management, ventilation and air conditioning, air protection, water and sewage systems, water and sewage technology, waste management, environmental biotechnology

We invite companies interested not only in solving their current problems but above all in their own development, modernization, improvement of efficiency and competitiveness.

Prof. Tomasz Mróz, D.Sc., Eng.

Dean of the Faculty of Civil and Environmental Engineering

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INSTRON 8505

Tensile strength testing machine (2400 kN)

APPLICATION:

- hydraulic machine for load statics and dynamics testing of structural elements, and strength properties of buildings structures and materials



KEYWORDS

- statics
- dynamics
- structural elements
- concrete
- lightweight concrete



INSTRON-SATEC

Tensile strength testing machine

APPLICATION:

- static machine:
 - compression, bending and extension tests of samples,
 - testing strength properties of buildings structures and materials

KEYWORDS

- static load
- compression tests
- bending tests,
- extension tests
- samples testing of different building materials

Toropol K-010 Chamber for frost resistance testing

APPLICATION :

- frost resistance testing of concrete samples and elements for classes of frost resistance F25 - F300



KEYWORDS

- concrete
- frost resistance
- frozen cycles -18 °C to +18°C

Passive house with testing equipment

APPLICATION :

- teaching and training scientific workers and students from civil engineering faculty to design building structures with low energy consumption, presenting special high isolation wall and roof materials, doors, windows etc., air-tight rooms testing.



KEYWORDS

- low energy consumption buildings
- air - tight building
- thermo isolation
- recuperation systems

Dygestorium DXH-H.18

APPLICATION :

- laboratory testing of building materials, fluids and gases

TECHNICAL SPECIFICATIONS :

- projection 1800x930 mm, height 2400 mm



KEYWORDS

- building chemistry
- chemical reactions
- feature specifications

Experimental set-up for testing the dynamic stress-strain response of materials (HOPKINSON BAR AND GAS GUN)

APPLICATION :

- system used to determine the dynamic behaviour of ductile materials during compression, shearing and perforation for strain rate from 200 to 10000 1/s

TECHNICAL SPECIFICATIONS :

The measurement systems consist of:

- Hopkinson bar
 - bars: incident and transmitter
 - gas gun
 - and a system that can measure in both bars the longitudinal waves (strain gauges, capacitor and oscilloscope)
- Gas gun
 - three interchangeable barrels with diameters of 6, 12 and 18 mm
 - gas gun - pressure from 1 to 100 bar
 - integrated sensors to measure the initial and residual speed of the projectile – dependent on the mass of the projectile and its diameter the max velocity is 600 m/s



KEYWORDS

- testing the dynamic stress-strain response of materials

High-speed cameras: Phantom® v711 and Phantom Miro 320S

TECHNICAL SPECIFICATIONS:

- High-speed camera Phantom v711 with mobile stand. Camera Phantom v711 can record 7 530 frames per second with maximum resolution. It is smaller, lighter and has additional connectivity controls than previous generation. Basic camera parameters: maximum resolution – 1280x800, maximum recording speed with reduced resolution 128x32 – 680 000 fps, throughput – 7 Gpx/s.
- Phantom Miro 320S can record 1 380 frames per second with maximum resolution. Basic camera parameters: maximum recording speed 325 000 fps with reduced resolution 64 x 8, throughput – 3.2 Gpx/s.

APPLICATION:

- analysis of high-speed industrial processes within the macro and micro scales together with hardware and software designed for the analysis of selected parameters of processes and phenomena

KEYWORDS

- High-speed camera
- Dynamic processes



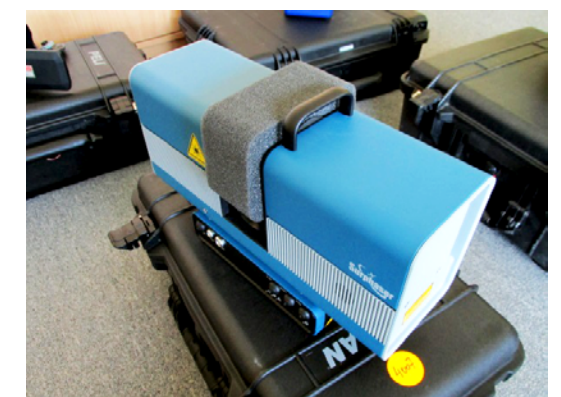
3D scanners: Comet L3D and 3D Surphaser® 100HSX

TECHNICAL SPECIFICATIONS:

- Monochromatic digital scanner Comet L3D with mobile stand
Comet L3D is a new generation digital 3D scanner. Due to additional software prototype a digital model inspection and quantitative verification can be conducted. Basic scanner parameters: acquisition accuracy – 30 um (0,03 mm), scanning volume – 40 x 30 x 25 cm, one measurement time – 1,5 s.
- Laser 3D scanner Surphaser® 100HSX dedicated to scan large objects
Device for hemi-spherical scanning of small, medium or large objects. Ideal for use in reverse engineering, dimensional control, BIM (building information modelling). Work range from 1,5 m up to 180 m.

APPLICATION:

- 3D scanning of space and objects
- determination of geometry quality
- determination of buildings deformation



KEYWORDS

- 3D scanning

Thermal cameras: FLIR SC7000 and FLIR T420

TECHNICAL SPECIFICATIONS:

FLIR SC7000

- Scientific camera FLIR, SC series allows to register frames with high thermal accuracy (17 mK), resolution (640 x 512 px) and maximum frame rate 35 000 fps. During high speed registration external trigger can be used.

FLIR T420

- The camera uses infrared technology. Main advantages are ergonomic design, low weight and easy use. Technical parameters: resolution 320 x 240 px, thermal accuracy 45 mK, temperature measurement range from -20 degrees Celsius to 650 degrees Celsius. Digital and thermal (infrared). Both digital and infrared view can be displayed at the same time on 3,5" LCD screen.



KEYWORDS

- fast thermal camera
- dynamic processes

APPLICATION:

- thermal analysis of industrial processes

TECHNICAL SPECIFICATIONS:

- Manufacturing of laser sintering technology. Element print size: 11 x 15 x 13 cm. Print efficiency equals 20 cm³/h, printing speed 10mm/h. Prototype material is polyamide-12.

APPLICATION:

- 3D prototyping

3D Printer: 3D Sinterit LISA



KEYWORDS

- 3D printer
- Prototyping

Bresser-Microcam with LED lightning system



TECHNICAL SPECIFICATIONS:

- Bresser-Microcam camera with LED lighting and Nikon AZ100 microscope. The system allows to acquire digital magnification between 5x to 400x (colour and monochrome), effectively couples advantages of typical stereo and compound systems. The mechanism guarantees continuous transition between micro and macro specimen observations. LED system can provide additional specimen lighting.

KEYWORDS

- microscope

APPLICATION:

- analysis of objects structures

Rigid static load tester plate with 5 electronic sensors and Spider 8 signal amplifier (incl. Catman Easy software)



APPLICATION:

- used for precise measurement of soil substratum compliance (bearing capacity)

KEYWORDS

- static plate

Large-scale direct shear test machine

Large-scale direct shear test machine with non-standard custom dimensions (100x120 cm) of the test chamber (shear box), a modern mechanism of applying shear load, a system of vibratory compacting of tested material and fully computer-controlled test process.



KEYWORDS

- direct shear test machine

APPLICATION :

- The machine is intended for testing coarse-grained materials. It enables shear strength test of crushed stone or geotechnical expanded clay aggregate to determine shear strength at joints of geosynthetic and coarse-grained materials. This is an original proprietary design by the Institute staff members.

TECHNICAL SPECIFICATIONS:

Components:

1. 6-channel, 16-bit control and measuring module, with geophones amplifiers, a USB port for the onboard computer and a power adapter 240V AC -12V DC (dimensions: 400 mm x 380 mm x 150 mm, weight 5.5 kg, continuous work when powered by 12V battery up to 8 hours, sampling rate (6 channels simultaneously) - 225000/s)
2. impact plate and 12 lb hammer with connecting cable
3. integrated 6-channel geophone cable
4. 6 geophones 4.5 Hz

The measurement results (processed by stand-alone software):

- numerical data and graphs showing vertical distribution of elasticity modulus values at the site the measurement was performed

Maximum range of data acquisition:

- 8 to 20 m under the ground surface, depending on types of substrate soils

Time of performing the test at a single site:

- about 30 minutes



Micro-seismic SASW test set

APPLICATION :

- Equipment for testing vertical distribution of modulus of elasticity of multi-layered soil substrate using spectral analysis of surface waves, generated by impact on the ground surface. Measurement of waves propagation is performed by a set of geophones connected to programmable controlling-recording module. The equipment was produced by GDS, a British company.

KEYWORDS

- micro-seismic test

Leica TCRP 1201 + Precision Total Station

APPLICATION :

- Total Station enables automatic tacheometric measurements with the function of target detection and tracking. In precision applications as targets precision prismatic reflectors are being used.



TECHNICAL SPECIFICATIONS :

- Precision of angular measurements: $\pm 1''$, linear: $\pm 1\text{mm}$
- It is possible to remotely control with the use of proprietary software with the ability of upgrading it with user functions.

KEYWORDS

- Precision Total Station

Unmanned Aerial Vehicle for photogrammetric applications



APPLICATION :

- Hexacopter is equipped with an adapter to install a camera that allows registration of objects from the air in order to acquire and develop pictures for surveying purposes or diagnostics. It is used in the preparation of orthophotos, digital elevation models and calculations of mass volume of sand, gravel, etc.

KEYWORDS

- UAV
- hexacopter
- photogrammetry

Blower door



APPLICATION:

- Building airtightness testing, air leakages location and building envelope quality control

TECHNICAL SPECIFICATIONS:

Minneapolis Blower Door™ Model 4:

- adjustable aluminum mounting frame 0.70x1.30 m ÷ 1.14x2.41 m
- nylon door/window cover
- BlowerDoor fan
- control and measurement system DG-700

Specification:

- weight - 30 kg
- transportation - car
- assembly time - 15 minutes
- power supply - 240V

Measuring range:

- 20 ÷ 7200 m³/h Δp 50 Pa
- Flow measurement accuracy $\pm 4 \%$

KEYWORDS

- airtightness test

A high-resolution thermovision camera with interchangeable lenses

TECHNICAL SPECIFICATIONS:

Thermal image parameters:

- detector type FPA (Focal Plane Array) a microbolometer of 384 x 288 pixels
- image resolution 384 x 288 pixels or 320 x 240 pixels (switched)
- field of view 15°x10° (standard) or 9° x 7° (option) or 30° x 23° (option)
- minimum measurement distance 0.5 m (standard lens), 0.1 m (wide angle lens)
- image frequency 30/60 Hz
- thermal resolution NETD 0.065°C for 30°C
- spatial resolution 0.7 mrad (standard lens), 0.4 mrad (telephoto lens), 1.4 mrad (wide angle lens)
- spectral range 8 - 14 μm
- built-in color video camera 640 x 480 pixels

APPLICATION:

- study of the building's structure for heat loss
- identification of thermal bridges



KEYWORDS

- thermovision

Portable ultrasonic clamp-on flowmeter Fluxus F601

APPLICATION :

- Flow measurement (or mass flow) of liquid at 60°C at close circular pipe cross section. The flowmeter is a clamp-on device, so it is non-invasive. The flowmeter is equipped with transducers for installation on outside surface of a pipe from 20 to 2000 mm in diameter. It is suitable for measurement and recording of flow of water and pure liquids flowing through topped up pipes. The device is equipped with two temperature transmitters. It is therefore possible to measure two magnitudes, i.e. the flow and temperature of the flowing liquid.



Measurement technique:

Measured value of a liquid flow is determined by the flowmeter based on the measurement of an ultrasonic wave propagation. Ultrasonic wave velocity measurement determines the velocity of liquid and the flow, considering the inner dimension of a pipe.

TECHNICAL SPECIFICATIONS :

- Measurement accuracy about ±1,6% (depending on measurement conditions and liquid purity).
- Liquid temperature up to 60°C.
- Outer pipe diameter range from 20 to 2000 mm.

KEYWORDS

- flow measurement and recording

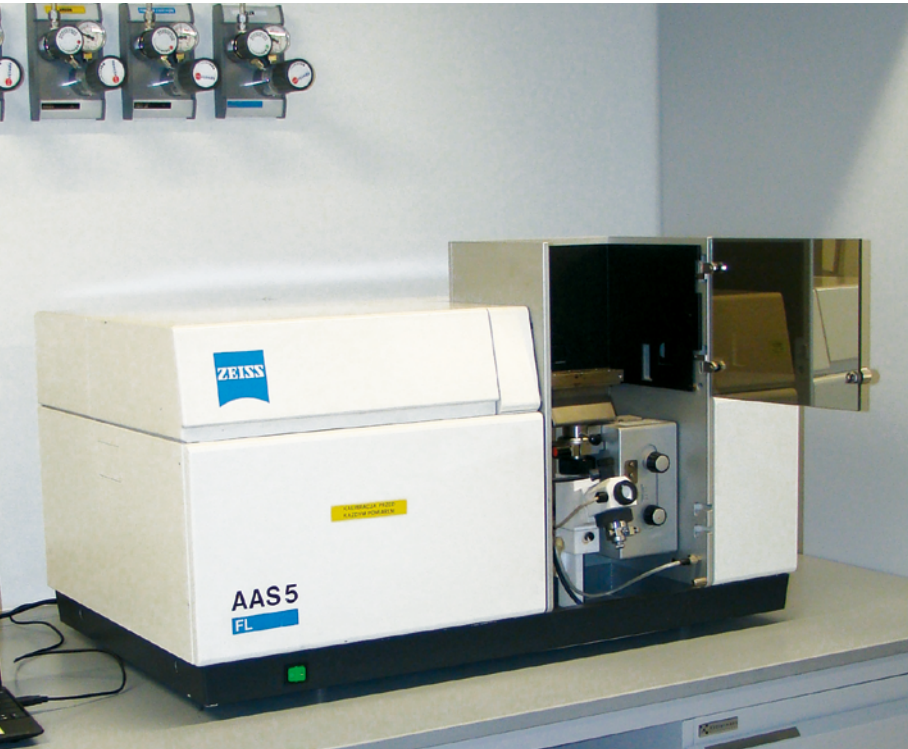
Spectrophotometer

APPLICATION :

- determination of the total content of individual chemical elements (especially, metals) in environmental samples

TECHNICAL SPECIFICATIONS :

- capable of determination of: Se, Cr, Cd, Al, Pb, Ni, Mo, Si, Zn, Cu, Mg, Ca, V, As, Sb



KEYWORDS

- chemical elements

Contact

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