Product Overview Chemical Analysis

AAS
ICP-OES
ICP-MS
C/N/S/X
TOC/TN\textsubscript{b}
AOX
UV/Vis
Innovation for Analytical Solutions

Analytik Jena stands for high-quality analytical instrumentation tailored to the needs of our customers. At our R&D and production sites throughout Germany, we develop and manufacture innovative technologies that convince with their unique analytical performance.

Tradition with innovative power

Analytik Jena takes pride in a long history and tradition of developing high-end analytical instrumentation, which dates back to the inventions made by Ernst Abbe and Carl Zeiss in Jena over 150 years ago.

Within the last 25 years Analytik Jena has become one of the most innovative manufacturers of analytical measuring technology that serves the demands of routine laboratories as well as of sophisticated niche applications worldwide.

Industries and fields of application:
- Food & Agriculture
- Environment
- Chemicals & Materials
- Geology, Mining & Metals
- Oil & Gas
- Pharma & Life Science
- Power & Energy

Superior Technology from Jena

Analytik Jena develops and manufactures high-end analytical instrumentation, accessories and software solutions that meet all the requirements of chemical analysis.

Sample Preparation & Digestion
- Homogenization – SpeedMill PLUS
- Microwave digestion – TOPwave
- AGX sample preparation – APU family and AFU
- HPLC for LC-ICP-MS – PQ LC

Elemental Analysis
- AAS – novAA- and ZEEnit series
- AAS – contrAA series
- Accessories for AAS
- Mercury analysis – mercur DUO plus
- ICP-OES – PlasmaQuant 9100 series
- ICP-MS – PlasmaQuant MS series
- C, N, S, Cl elemental analysis – multi EA 5100
- S, N elemental analysis – compEAct series
- C, S, Cl elemental analysis – multi EA 4000

Sum Parameter Analysis
- TOC/TN – multi N/C series and multi N/C pharm series
- AOX/TOX/EDX – multi X 2500

Molecular Spectroscopy
- UV/Vis – SPECORD S 600
- UV/Vis – SPECORD PLUS series
Sample Preparation and Digestion

Analytik Jena offers versatile systems for the preparation of samples a wide range of applications – from homogenization and microwave digestion to species separation by HPLC for LC-ICP-MS.
Homogenization

SpeedMill PLUS

SpeedMill PLUS is a system for highly efficient homogenization of a wide range of starting materials. Up to 20 samples can be completely and reproducibly homogenized in parallel. Efficient sample cooling enables preparation without cost-intensive and complex consumables such as liquid nitrogen or dry ice.

SpeedMill PLUS at a glance:
- Touch control panel and large display for considerable operating convenience
- Pre-programmed protocols or user-defined programming with freely selectable parameters
- Can easily be operated continuously
- Homogenizing with comparably low-noise
- No tools required to operate the instrument

Microwave Digestion

TOPwave

TOPwave for microwave-assisted pressure digestion enables sample preparation for a variety of applications. Short cycle times and large capacities ensure a high sample throughput. The patented sensor concept and the intelligent design enable reaction control and operational reliability at the highest level.

TOPwave at a glance:
- High sample throughput
- Minimum number of consumables
- Sensor concept which documents all digestion parameters of each sample thanks to wireless optical temperature control with RTM, wireless optical pressure control with RPM and SMART reaction control
- Self Check System (SCS)

AOX Sample Prep

APU family / AFU

The systems of the APU 28 series and APU sim are universally applicable, not only ideal for AOX sample preparation, but also for enrichment of samples to determine the environmental parameter AOF. Sample and rinsing volumes are individually selectable.

APU at a glance:
- Automatic preparation of up to 28 samples according to column method (DIN EN ISO 9562)
- Suitable for unattended 24/7 operation
- Very robust, ideal for particle-containing and saline samples
- Flexibility: Compatible with columns from all manufacturers

APU 28 – sequential sample preparation
APU 28 S – simultaneous preparation of 2 samples
APU sim – simultaneous enrichment of up to 6 samples or semiautomated preparation of SPE-AOX samples
AFU 3 is the versatile system for semiautomated sample preparation of up to 3 samples by batch method. The filtration takes place directly into the frit container. The system is extendable for sample preparation according to column method.

AFU 3 – sample preparation of up to 3 samples by batch method

Liquid Chromatography

PQ LC

PQ LC is a series of modular chromatography systems for LC-ICP-MS in combination with PlasmaQuant MS, ideally suited for the determination of element species. PQ LC is available as a compact routine LC system for limited lab space or as fully equipped LC model. An ion chromatography option completes the portfolio.

PQ LC at a glance:
- Variable modular design for easy upgrade
- Easy handling with up to four solvents for uncompromised method flexibility
- Interactive setup for seamless communication

PQ LC compact – the routine HPLC system, metal free in PEEK
PQ LC – available in stainless steel and PEEK with various upgrades
PQ IC – the uncompromised ion chromatography solution

Digestion vessels, easy to use without tools
Elemental Analysis – Innovative Technologies for Flexibility and Efficiency in Various Applications

Analytik Jena's broad technology portfolio offers instrument solutions for all application requirements in elemental analysis. Performance-enhancing accessories and auto samplers round off the range.
Atomic Absorption Spectrometers (AAS)

novAA | ZEEnit

Reliable partner for routine element analysis
The AAS series novAA and ZEEnit combine high performance, versatility, automation, reliability and robustness for various applications in elemental analysis.

novAA and ZEEnit at a glance:
- 8 lamp changer for maximum automation and sample throughput
- Fully automatic gas box and automatic burner height adjustment
- Single and double beam optics
- Integrated high-end vision tool for monitoring the processes in the graphite furnace
- Fully automated optimization routines
- Analysis of liquid and solid samples
- D2 background correction

The novAA series offers efficient, cost-effective systems for AAS routine applications in various industries.

novAA 800 F – AAS for flame and hydride technology
novAA 800 G – AAS for graphite furnace technology
novAA 800 D – AAS for flame, hydride and graphite furnace technology

ZEEnit 650 P – high-performance graphite furnace AAS
ZEEnit 700 P – high-performance AAS for flame, hydride and graphite technique

The ZEEnit P series is designed for routine trace analysis in demanding matrices. The systems combine an outstanding graphite furnace concept with the most powerful and latest generation of Zeeman effect background correction with variable magnetic field strength.

Special features:
- Zeeman and D2 background correction
- 2Field Mode – maximum sensitivity
- 3Field Mode – expansion of the linear working range
- Dynamic Mode – automatic adaptation to varying element concentrations without dilution
- Direct analysis of solid samples

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High-Resolution Continuum Source AAS
contrAA

contrAA – AAS redefined
contrAA closes the gap between AAS and ICP-OES and offers the optimal solution for users who need a high degree of flexibility with regard to element selection and application range as well as powerful detection limits and higher sample throughput and who do not want to do without the robust operation of the AAS.

contrAA at a glance:
- Multi Element – one light source for fast sequential and simultaneous multi-element analysis
- High-Resolution Optics – interference-free analysis and highest precision by means of detailed 3D spectrum display
- Significantly better detection limits and higher throughput in flame operation
- Direct solids technology

Simple method development
With only one light source, the contrAA 800 measures all elements and over the entire wavelength range of 185–900 nm.

The user can freely select the optimal line for the respective analysis task and determine the elements in optimized sequences with fast line-switching and simultaneous background correction.

Interference-free analysis
The high-resolution 3D spectrum display opens up unprecedented possibilities for parameter optimization. Users can easily identify interferences and precisely correct them using innovative software routines.

Increased productivity
The HR-CS technology allows the number of samples to be increased by up to 40% in flame mode. Powerful detection limits in flame and graphite tube mode improve the detection capability.

Expanded application range
Evaluation of atom lines and molecular bands allows the analysis of additional elements like non-metals.
Multiple solutions for special challenges
The modular systems for the determination of hydride-forming elements and mercury in flow injection and Batch Mode guarantee convenient handling, precision and efficiency during analysis. The standard method is hydride formation and atomization in the electrically heated quartz cell. For high-performance trace analysis, electrothermal atomization can also be performed in a graphite furnace.

- Flow Injection Mode: fully automated mode with optimized gas / liquid separator and membrane drying system ensures high sample throughput
- Batch Mode: special designed reactors for large sample volumes, for foaming samples and low element concentrations
- Enrichment Mode: integrated gold collector unit for the enrichment of mercury

**solid AA – direct solid AAS**
Solid and paste like samples, as powders, creams or viscous oils can be analyzed directly in the graphite furnace. In direct solids analysis, the decomposition of the sample matrix by means of an acid digestion is replaced by the temperature program of the graphite furnace.

**solid AA at a glance:**
- Simple and direct analysis of the original samples
- Highly sensitive trace analysis of sample quantities in the microgram range
- Selection of the degree of automation from manual to fully automatic handling of up to 84 samples
- Integrated liquid dosing module for calibration and addition of reagents

Analytik Jena’s contrAA and ZEEnit graphite furnace systems can be upgraded with the solid AA technology.

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<thead>
<tr>
<th>Module</th>
<th>Description</th>
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<tbody>
<tr>
<td>HS50</td>
<td>simple Batch Mode, flame heated cell</td>
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<tr>
<td>HS55</td>
<td>Batch Mode, electrically heated cell</td>
</tr>
<tr>
<td>HS60</td>
<td>fully automated system with Flow Injection and electrically heated cell</td>
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**Mercury analysis with best analytical certainty**
The mercur DUO plus is a powerful mercury analyzer that meets all requirements and directives for mercury analysis (EPA, EN, ISO) based on atomic absorption (AAS) and atomic fluorescence (AFS). An integrated enrichment module with two gold collectors extends the range of applications. Depending on the type of sample and configuration, detection limits from the low ng/L (ppt) to the pg/L (ppq) range can be achieved with high method robustness.

**mercur DUO plus at a glance:**
- Highly automated and fast – continuous flow injection with or without autosampler and unique FBR routine
- Safe – bubble sensor, specially optimized drying membrane and cascade enrichment
- Efficient – intelligent gas-liquid control; minimum reagent consumption and short measurement times
- Reliable – Self Check System (SCS)

**The Segmented Flow Star SFS 6.0** is a switching valve for flow injection operation. It continuously rinses the sample introduction system and the burner head and enables the segmented introduction of smallest sample volumes. It also reduces carry-over effects with high salt and matrix contents and the risk of clogging of the burner head.

**The “Scraper”,** an automatic, software-controlled cleaning device for the nitrous oxide flame, guarantees continuous and reproducible operation over a long time.

**The AS-F, AS-FD and AS-GF autosamplers** offer unique flexibility and efficiency in routine analysis. Functions such as intelligent dilution and pre-concentration, automated dosing of modifiers and automatic depth adjustment, combined with high dosing accuracy, make unattended operation (even overnight) routine and guarantee high sample throughputs.

**Mercury Analyzer**

**Accessories**

**AAS**

![Top: Scraper Bottom: SFS 6.0](image)

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<td>SSA 6z</td>
<td>manual solid sampler</td>
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<td>SSA 600</td>
<td>fully automated solid sampler with integrated microbalance and liquid dosing module</td>
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**Mercury Analyzer**

**mercur DUO plus**

![Top: Scraper Bottom: SFS 6.0](image)

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- Safe – bubble sensor, specially optimized drying membrane and cascade enrichment
- Efficient – intelligent gas-liquid control; minimum reagent consumption and short measurement times
- Reliable – Self Check System (SCS)
High-Resolution Array ICP-OES
PlasmaQuant 9100 / 9100 Elite

The unique resolving power, unmatched sensitivity and exceptional matrix tolerance of the PlasmaQuant 9100 Elite consistently offer the lowest detection limits and highest ease of use in demanding applications. Warranting the highest precision it is the first choice for advanced material analysis, research and quality control labs facing complex matrices including refractory, ferrous and high-purity metals, rare earths and petrochemicals.

With a clear emphasis on wide applicability, simplicity and cost-effectiveness the PlasmaQuant 9100 ensures excellent plasma performance, detection limits and accuracy in general applications. Fulfilling the demands of agricultural, food and environmental analysis it is a convincing all-rounder with enhanced productivity and operator comfort.

High-Resolution Array ICP-OES
PlasmaQuant 9100 / 9100 Elite

Impressive analytical performance
Innovative components of the PlasmaQuant 9100 series set a new standard in analytical performance:

- **High-Resolution Optics**
  - Double-monochromator Echelle Optic for interference-free analytics
  - HR-CCD detection with exceptional wavelength accuracy

- **V Shuttle Torch**
  - Vertical plasma torch with shuttle design for carefree operation
  - Plug-and-play installation with precision auto-alignment

- **Dual View PLUS**
  - 2+2 plasma views for extended working range
  - Argon-neutral counter-gas technology for unique sensitivity

- **High-Frequency Generator**
  - Unrivaled plasma performance for direct analysis of extreme matrices
  - Short warm-up for high method flexibility and low running cost

*only available with the PlasmaQuant 9100 Elite

High-Performance ICP-MS
PlasmaQuant MS- / PlasmaQuant MS Elite-series

Powerful, patented technology
The PlasmaQuant MS is the world’s best performing quadrupole ICP-MS. With their unsurpassed sensitivity of over 1.5 million counts/second/ppb and halved argon consumption the instruments of the PlasmaQuant MS series guarantee efficiency and precision in high-throughput analysis and demanding research with unsurpassed low operating costs. The high sensitivity guarantees lowest detection limits, even when diluting high matrix samples and enables high sample throughput without compromising precision. The combination of an efficient HF generator and an intelligent torch design reduces argon consumption by up to 50% while maintaining excellent plasma robustness.

PlasmaQuant MS at a glance:
- Eco Plasma – robust plasma performance with only half the argon gas
- iCRC – Integrated Collision Reaction Cell, for interference-free analysis plus BOOST technology
- ReflexION – reflecting 3D focusing ion mirror for maximum sensitivity
- HD Quadrupol – 3MHz quadrupole for superior mass separation
- AD Detection – All-Digital Detection System with 11 orders of analytical range (0.1-10^{10} cps)

PlasmaQuant MS – the robust ICP-MS for sensitive characterization of high matrix samples
PlasmaQuant MS Q – the universal ICP-MS for high throughput and best detection limits in routine monitoring and quality control
PlasmaQuant MS Elite S – the specialist with elite sensitivity and best signal-to-noise ratio for unparalleled ultra-trace performance
PlasmaQuant MS Elite – the only ICP-MS of choice for research applications
C, N, S, X – in Any Kind of Sample
multi EA 5100

The multi EA 5100 is a universal talent to be used in various fields of application for the determination of TC, TN, TS, TCI and also TOC, EDX, EC/OC and AOX/TOX. The globally unique double furnace technology offers fast and optimum adaption to the sample matrix and analysis standard with minimal effort. Its unique modular principle allows an individual configuration and adaption of the multi EA 5100 to growing needs and requirements.

multi EA 5100 at a glance:
- Multi-application: liquid, solid and gaseous samples
- Multi-element: C, N, S and Cl as well as TOC, EDX, AOX/TOX and EC/OC analysis
- Wide measuring range, from ppb to wt-%
- Preset standard methods, including a comprehensive library of approved methods for routine analysis and special applications
- Standard compliance, ASTM, EPA, DIN, ISO, EN, etc.
- Flame sensor technology for matrix-optimized sample decomposition
- Double furnace technology – vertical and horizontal mode in a single instrument
- Multi-purpose combustion tube for all standard applications
- Multi matrix sampler, for fully automatic determination of solid, liquid, TOC, EDX and AOX/TOX samples in vertical or horizontal operation
- Application-optimized sampling systems for safe and reliable analysis of pressurized and none pressurized gases and LPG samples
- Self Check System (SCS) for maximum safety with minimum maintenance requirements

N, S – Liquids / Gases
compEAct N / compEAct S and SMPO

Efficient TS and TN determination in liquids, gases and LPGs in the smallest of spaces
The stand-alone devices of the compEAct series combine efficient, catalyst-free high-temperature combustion with highly sensitive HiPerSens detection and provide maximum sample throughput with minimum space requirement.

compEAct at a glance:
- Economical and efficient – smallest footprint, short measurement times and ideal for unattended operation
- User-friendly and functional – integrated system control with intuitive touch operation and remote access options
- Safe and compliant – automatic monitoring and optimization of all process parameters as well as conformity to ASTM, IP, EN, DIN and UOP
- Double furnace technology – vertical and horizontal mode in a single instrument
- Multi-purpose combustion tube for all standard applications
- Multi matrix sampler, for fully automatic determination of solid, liquid, TOC, EDX and AOX/TOX samples in vertical or horizontal operation
- Application-optimized sampling systems for safe and reliable analysis of pressurized and none pressurized gases and LPG samples
- Self Check System (SCS) for maximum safety with minimum maintenance requirements

C, S, Cl – Solids
multi EA 4000

Simple and flexible C, S, Cl analysis in solids
multi EA 4000 convinces with its ease of use, analysis flexibility, and particularly excellent instrument stability and precision. It allows a unique combination of elements and parameters to be analyzed, TS, TC, TX, TIC, EC, Cl and BOC. Therefore it is unchallenged in waste analysis! The modular design of the device allows to expand the application options from one element to fully automated multi-parameter analysis.

multi EA 4000 at a glance:
- High ease of use and flexibility
- Enhanced analysis with precision and reliability
- Minimal operating costs and low maintenance effort
- Fully automated TOC determination
The TIC solids module “automatic” allows for an automatic determination of the Total Inorganic Carbon (TIC) in solid samples. Thus also enabling an automated determination of the Total Organic Carbon (TOC) using difference or direct method. Additional sample pre-treatment like manual acidification is not necessary.
Sum Parameter Analysis – Clever Solutions for Water and Environmental Analysis as well as Applications in the Pharmaceutical Industry

Whether in the analysis of drinking and waste water, pharmaceutically used water or cleaning validation, surface water or solid analysis, e.g. TOC in soils or waste – optimized solutions from Analytik Jena make sum parameter analysis simple and efficient.
Sample Preparation               Elemental Analysis                Sum Parameter Analysis                Molecular Spectroscopy

throughput.
analyzing and purging in NPOC mode, increase the sample
TOC analysis. Time-optimized processes, such as parallel
a high degree of automation for diverse requirements in
homogenization, automatic acidification and purging provide
The available autosamplers with integrated sample
solid modules, such as the HT 1300, allow the digestion of
solid samples at up to 1300 °C in a robust ceramic tube.
The available autosamplers with integrated sample
homogenization, automatic acidification and purging provide
a high degree of automation for diverse requirements in
tOC analysis. Time-optimized processes, such as parallel
analyzing and purging in NPOC mode, increase the sample
throughput.

TOC-, TNb Analyzers               multi N/C series

multi N/C – high-performance TOC analyzers
With the instruments of the multi N/C series, the parameters
TOC, NPOC, POC, TC, TIC and TN, can be measured easily,
quickly and without conversion in aqueous samples. Separate
solid modules, such as the HT 1300, allow the digestion of
solid samples at up to 1300 °C in a robust ceramic tube.
The available autosamplers with integrated sample
homogenization, automatic acidification and purging provide
a high degree of automation for diverse requirements in
tOC analysis. Time-optimized processes, such as parallel
analyzing and purging in NPOC mode, increase the sample
throughput.

TOC-, TNb Analyzers               multi N/C pharma series

multi N/C – tailored solutions for TOC and TN
analyses in the pharmaceutical industry
From ultrapure water control and cleaning validation to
extractables testing from packaging materials to total
protein analysis in vaccines, the multi N/C pharma series
offers optimized solutions complying with international
pharmacopoeia regulations.
Enhanced software features make sure for full data integrity
and FDA 21 CFR Part 11 compliance. A complete service
package including system qualification and software
validation ensures reliability and maximum comfort in the
operation of the analyzers.

AOX/TOX Analyzer
multi X 2500 – unique flexibility in AOX analysis
Whether POX determination, fast AOX routine analysis in
vertical mode, reliable determination of the smallest EOX
trace contents or TOX analysis for other organic liquids and
solids, such as waste oil, in horizontal operation, the double
furnace technology of the multi X 2500 allows the free
choice of the best combustion mode for each application.
The intelligent software multiWin, the fast changeover
between column and batch method, and the user-friendly
design ensure outstanding ease of use. Modules for sample
preparation according to column or batch method as well as
diverse sampling systems ensure flexibility and guarantee
maximum sample throughput with minimum operating
effort.

multi X 2500 at a glance:
■ Versatile application – POX, EOX, AOX by column and
batch method, TOX, TOC
■ Wide measuring range from ppb to wt-%
■ Standard conformity with ASTM, EPA, DIN, ISO, EN etc.
■ Flame sensor technology for matrix-independent,
optimum measurement results
■ Double furnace technology enables vertical and horizontal
combustion in a single unit
■ Flexible automation for maximum sample throughput
Molecular Spectroscopy – Highly Flexible and Uniquely Versatile

Innovative and intelligent technology in combination with decades of experience create instrument solutions that guarantee reliability, user-friendliness and flexibility in UV/Vis analysis.

New standards in UV/Visible spectrophotometry
The SPECORD series covers the entire spectrum from high-performance spectrophotometers with split beam technology to two-beam spectrophotometers with cooled double detection to high-performance diode array systems for simultaneous high-speed measurements. The instruments operate in the spectral range from 190 to 1100 nm and 185 to 1200 nm for SPECORD 210 PLUS respectively. Versatile software, special software packages and a wide range of accessories guarantee easy operation, flexibility and high efficiency in a wide variety of applications.

SPECORD S 600 – diode array system
SPECORD S 600 combines the precision and convenient handling needed in laboratories with speed, reliability and superior optical performance.

SPECORD S 600 at a glance:
- High-precision diode array systems
- Excellent spectral properties, fast measurement of complete spectra in less than 12 milliseconds
- Self-adjusting photometric linearity, automatic stray light correction, open sample compartment

SPECORD PLUS series at a glance:
- Automatic accessory recognition
- Large, easily accessible sample compartment
- Extensive method collection
- Software tool for the device check

SPECORD PLUS series:
Routine analysis or special applications – with the double beam spectrophotometers of the SPECORD PLUS series you are well prepared for all requirements.

SPECORD PLUS 50 – double-beam spectrophotometer with Split-Beam-Technology
SPECORD 200 PLUS – double-beam spectrophotometer with fixed spectral bandwidth
SPECORD 210 PLUS – double-beam spectrophotometer with five variable spectral bandwidths and expanded measurement range (185–1200nm)
SPECORD 250 PLUS – double-beam spectrophotometer with five variable spectral bandwidths and double monochromator

SPECORD S 600 – diode array spectrophotometer for UV to NIR range (190–1100 nm)