Determining pollutants in environmental and food matrices requires efficient sample preparation. BUCHI offers a wide range of solutions for reliable, efficient, flexible and safe sample processing procedures in the laboratory work flow to enhancing productivity and quality.
“Quality in your hands” is the guiding principle that shapes our philosophy and our actions. It challenges us to provide outstanding services that are precisely tailored to your needs. This means that we must stay in close contact with our customers. That is why we keep in touch and continue to work very hard to understand you and your business even better.

We help you by providing high-quality products, systems, solutions, applications and services that offer you added value. This allows you to focus entirely on your processes and your work.

**Core messages to our customers**

**BUCHI creates added value with “Quality in your hands”**

**Easy**

You handle complex processes, do challenging work and want to focus on what is essential. We support you by providing carefully designed solutions as well as instruments and systems that are easy to operate.

**Competent**

You need products, systems, solutions, applications and services that are precisely tailored to your needs. We have the technological expertise and decades of experience needed to provide competent support and work with you to continually improve our market services.

**Reliable**

You want to be able to rely completely on your partner for products, systems, solutions, applications and services. We guarantee the quality and functionality of our equipment and will continue to help you quickly and efficiently whenever something does not operate to your satisfaction.
Cost-effective
You want to achieve the best possible results using efficient solutions. We help you to handle your jobs and processes economically. We strive to create a high level of economic benefit and maximum added value for you.

Safe
You are working in an environment in which safety is a high priority. By collaborating closely with you, we do everything in our power to make our products, systems, solutions, applications and services as safe as possible for people and the environment.

Global
You value personalized service and short communication channels. As an international family-owned business with our own subsidiaries and qualified distributors, we have a presence wherever our customers are located. Our local staff and the large number of satisfied customers around the world give you the assurance that you are working with the right partner.

Sustainable
You prefer a partner who acts responsibly when it comes to current environmental challenges. We support environmentally friendly processes and manufacture products that have a long service life. We utilize advanced technologies in order to conserve energy and water and leave the smallest environmental footprint possible.
A clean and safe environment is a pre-requisite for health and quality of life. BUCHI contributes to this by providing market-leading solutions for sample preparation and analysis to a wide range of industrial companies, environmental testing labs, consultants, and government authorities.

### Ingenious solutions for your matrices

Covering a wide variety of analytes

<table>
<thead>
<tr>
<th>Analyte:</th>
<th>Soil, sludge, sediment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyte:</td>
<td>Waste</td>
</tr>
<tr>
<td>PCDD/PCDF, PAH, PCB, flame retardants (BFR, PBDE), TPH, pesticides, Total Kjeldahl Nitrogen (TKN), trace and heavy metals, ammonia</td>
<td>Restriction of hazard substances (RoHS): PBDE and PBB, lead and cadmium from electrical and electronic products, trace and heavy metals</td>
</tr>
<tr>
<td>Matrix:</td>
<td>soil, sediments, sludge, brownfields</td>
</tr>
<tr>
<td>Matrix:</td>
<td>e-waste, recycled material, polymer waste, bio waste</td>
</tr>
<tr>
<td>Compliant with e.g.:</td>
<td>Compliant with e.g.:</td>
</tr>
<tr>
<td>EPA 1613B</td>
<td>EPA 8270</td>
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<tr>
<td>EPA 1664</td>
<td>IEC 62321</td>
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<td>EPA 1668B</td>
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<td>EPA 3540C</td>
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<td>EPA 3545A</td>
<td>DIN EN 13657</td>
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<td>ISO 16797</td>
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<td>EPA 9071</td>
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<td>DIN 38414</td>
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<td>DIN 13346</td>
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<td></td>
<td>ISO 16797</td>
</tr>
</tbody>
</table>
Our solutions comprise sample preparation and testing of air, soil, sediment, sewage sludge, waste and waste water to assess their quality with impact on health and the environment.

**Water, waste water**

**Analyte:**
- PAH, PCB, TPH, flame retardants (BFR, PBDE), Total Kjeldahl Nitrogen (TKN), phenol, cyanide, formaldehyde, chemical oxygen demand (COD), ammonia, nitrate and nitrites, phosphate

**Matrix:**
- municipal and industrial water discharges, water from sanitation, surface water, run-off from fertilized lawns, animal manure and storage areas

**Compliant with e.g.:**
- EPA 608
- EPA 8081
- EPA 8082A
- EPA 9010C
- EN 38414-20
- AOAC 973.48
- ISO 5663
- ISO 9377-2 (DIN H53)
- DIN 38406-E5-2
- DIN 38409
- NEMI D6303

**Air**

**Analyte:**
- PCDD/PCDF, PCB, nitrate, nitrite, ammonia

**Matrix:**
- ambient air, stack gas, incineration, car exhaust and fly ash

**Compliant with e.g.:**
- EPA 3542A
- EPA TO-4A
- EPA TO-9A
- EPA TO-10A
- EPA TO-13
- EN 1948

Find your solutions at: www.buchi.com/environmental
Dedicated solutions along your value chain
Covering the most important analytes in today's analysis

Our portfolio for environmental testing comprises of five sample preparation methods and supplementary application tools. They allow you to perform classical Soxhlet and hot extraction, pressurized solvent extraction, solid phase extraction, acid digestion and steam distillation.

<table>
<thead>
<tr>
<th>Solutions by BUCHI</th>
<th>Page</th>
<th>Analytes and parameter groups</th>
<th>Soil Sludge Sediment</th>
<th>Waste</th>
<th>Water / Waste Water</th>
<th>Air</th>
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</thead>
<tbody>
<tr>
<td>«Extraction Throughput»</td>
<td>8</td>
<td>Pesticides, PAH, PFC, TPH, phthalates, POPs as flame retardants (BFR), PCDD/PCDF, PCB</td>
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<tr>
<td>«Extraction Universal»</td>
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<td>Pesticides, PAH, PFC, TPH, phthalates, POPs as flame retardants (BFR), PCDD/PCDF, PCB</td>
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<tr>
<td>«Digestion &amp; Distillation»</td>
<td>12</td>
<td>TKN, urea, ammonia, nitrate, cyanide, formaldehyde, phosphate</td>
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<tr>
<td>«Dumas for environmental monitoring»</td>
<td>14</td>
<td>Nitrogen</td>
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<tr>
<td>«Reflux Digestion»</td>
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<td>Trace and heavy metals, COD</td>
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<tr>
<td>«Parallel Evaporation Pre-Analytical»</td>
<td>18</td>
<td>Pesticides, PAH, PFC, TPH, phthalates, hydro-carbon oil index, CHC/ HCH, PCB, DDT, PAH, POPs as flame retardants (BFR), PCDD/ PCDF</td>
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</table>
### Sampling

- Soil, sludge, sediment
- Waste
- Water / waste water
- Air

### Analytes and parameter groups

- Soil
- Sludge
- Sediment
- Waste
- Water / waste water
- Air

### Methods

<table>
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<tr>
<th>Sampling</th>
<th>Homogenization</th>
<th>Digestion</th>
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<th>Evaporation</th>
<th>Concentration</th>
<th>Clean-up</th>
<th>Analysis</th>
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<td>LC/MS</td>
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</tbody>
</table>

- inherent step
- optional

**Find your solutions at:**
www.buchi.com/environmental
You want to analyze various pollutants contained by byproducts of processes and materials contaminating our environment. We offer sample preparation solutions by pressurized solvent extraction for the analysis of persistent organic pollutants (POPs) and other contaminants.

**Solution «Extraction Throughput»**
Extraction, evaporation and concentration

Alt. solution: «Extraction Universal», page 10

**Extraction System B-811**
Four compliant and versatile extraction methods

**Recirculating Chiller F-308**
The efficient and water saving way of cooling

**Vacuum Pump V-300**
Parallel evaporation and concentration to defined volume

**SpeedExtractor E-916**
Air sample on polyurethane foam (PUF)

**Recirculating Chiller F-308**

**Custom glassware**

**Syncore® Analyst R-12 with flushback module**

---

8
Your most important benefits

Safe and reliable
- No contamination of samples since components in contact are inert
- No cross-contamination of adjacent positions due to individual valves and pathways
- Reliable analysis of low polluted samples with large cell volumes (up to 120 mL)
- No loss of analyte due to concerted workflow of extraction and concentration

Speed and throughput
- Up to 6 times faster than other PSE instruments thanks to parallel extraction concept
- Extraction of up to 96 samples in an 8 hour shift
- Acceleration of the extraction process, thus facilitate final results within one working day
- Reduced number of replicates due to identical extraction conditions for up to 6 samples

Low running costs
- Reduced solvent consumption for pre-cleaning cartridges / PUF and the extraction step
- Minimal need for consumables give lower running costs
- Save energy and costs with «ECO» mode for automated heater control
- Complementary workflow and synergy with parallel evaporation and concentration

Your solution «Extraction Throughput»

- PSE: SpeedExtractor E-916
- Concentration: Syncore® Analyst R-12 with flushback module
- Vacuum Pump V-300
- Cooling: Recirculating Chiller F-308

Options:
- PSE: SpeedExtractor E-914
- Parallel evaporation: Syncore® Analyst R-6, Multivapor™ P-12 / P-6
- Evaporation: Rotavapor® R-300
- Solid Phase Extraction (SPE)

- Comprehensive list of reference applications
- Customized application support
- Authorized IQ/OQ documentation
- Practical workshops, trainings and seminars
- Preventive maintenance including IQ/OQ
- Minimize downtime thanks to our service hotline

“The parallel extraction operation of the SpeedExtractor saves us time whilst maintaining accuracy demanded by our customers”
Karl Pettit, Marchwood Scientific Services, Southampton, United Kingdom
You need a most flexible solution for the sample preparation step. We offer automated Soxhlet extraction and complementary evaporation solutions which are proven preparation techniques for the determination of pollutants like PCBs. For enhanced speed and throughput use pressurized solvent extraction with BUCHI’s SpeedExtractor.

**Solution «Extraction Universal»**

Extraction, evaporation and concentration

**Vacuum Pump V-300**

**Recirculating Chiller F-308**

**Extraction System B-811**

**Syncore® Analyst R-12**

with flushback module

**Alternative solution: «Extraction Throughput»**, page 8

- **SpeedExtractor E-916 / E-914**
  - Pressurized solvent extraction

- **Syncore® Analyst R-12 / R-6**
  - Parallel evaporation and concentration to defined volume

- **Recirculating Chiller F-308**
  - The efficient and water saving way of cooling
Your most important benefits

Wide range of application
- Extraction of persistent organic pollutants, TPH, PBDE, PFC or pesticides from soil, sludge and sediments
- Use high-boiling solvents of up to 150 °C thanks to efficient heating sources and optimal heat transfer

Flexible and fast
- Upmost flexibility by applying different automated extraction technologies without any modifications of the glass setup
- Achievement of the required detection limit thanks to 60% larger sample volume (B-811 LSV configuration)
- Shortened time to analysis and complementary workflow with parallel evaporation and concentration

Compliant and safe
- Assured conformity in accordance with the officially approved methods (e.g. EPA, ISO, HJ, ASTM)
- Fully compliant true Soxhlet apparatus
- Excellent operator protection without any compromise on the supervision of the entire process

Your solution «Extraction Universal»

- Extraction: Extraction System B-811
- Concentration: Syncore® Analyst R-12
- Vacuum Pump V-300
- Cooling: Recirculating Chiller F-308

Options:
- Extraction System B-811 LSV for large sample volumes
- Parallel evaporation: Syncore® Analyst R-6 Multivapor™ P-12 / P-6
- Evaporation: Rotary Evaporator® R-300
- Solid Phase Extraction (SPE)
- Comprehensive list of reference applications
- Customized application support
- Authorized IQ/OQ documentation
- Practical workshops, training and seminars
- Preventive maintenance including IQ/OQ
- Minimize downtime thanks to our service hotline

“The Extraction System B-811 makes sample preparation easier and quicker. The two benefits, time-savings and lower solvent consumption, are obvious.”
Doctor Liu Aiming, Laboratory Director of Sino-Japan Friendship Centre of Environmental Protection, China
You have to deal with various applications for monitoring or determining environmental parameters such as nitrogen, ammonia or other steam volatile compounds. BUCHI’s versatile solutions for digestion and steam distillation cover a broad range of applications in solids, waste water, fly ash and air.

Alternative solution: «Dumas for environmental monitoring » page 14

DuMaster D-480
Unattended and flexible protein determination
Your most important benefits

Highly flexible and convenient
- One solution for nitrogen determination, direct distillation or Kjeldahl applications
- Highest flexibility combing dedicated accessories and varying sample tube sizes
- Convenient operation thanks to automated procedures and enhanced visualization:
  - programmable digestion temperature profiles
  - distillation parameters like automated dilution, alkalization or acidification, aspiration of chemicals
  - automated titration with linked external titrators
  - Ready-to-use pre-programmed methods for various sample matrices

Fast
- Time savings of up to 135 minutes thanks to fast heating and cooling of the SpeedDigester
- Accelerated digestion process by optional continuous addition of $H_2O_2$
- Concerted online titration with dedicated titrators while the sample is still being distilled (K-360/Titrino Plus)
- Automated calculation and result transfer

Safe and secure
- Maximum safety thanks to perfectly sealing joints and the ultimate four stage Scrubber K-415 (QuadScrub<sup>ECO</sup>)
- Prohibition of unauthorized process or data manipulation with password protection (K-360)

Your solution «Digestion & Distillation»

- Distillation: KjelFlex K-360
- Digestion: SpeedDigester K-439
- Neutralization: Scrubber K-415 (TripleScrub<sup>ECO</sup>)
- Recirculating Chiller F-308
- Mixer B-400
- External third party titrators
- Options:
  - Distillation Unit K-350 / K-355
  - KjelMaster System K-375 / K-376 / K-377
  - KjelDigester K-446 / K-449
- Comprehensive list of reference applications
- Customized application support
- Authorized IQ, OQ and PQ documentation
- Useful tools for application development
- Practical workshops, trainings and seminars
- Preventive maintenance including IQ/OQ/PQ
- Minimize downtime thanks to our service hotline

“BUCHI is considered as the key supplier for nitrogen determination application for the SDL. The training and support from BUCHI was in every way excellent and we look forward to future collaboration.”
Barry Daniel Nourice, Principal Laboratory Officer, Seychelles Agricultural Agency, Seychelles
You look for an easy and automatic technique which allows fast analysis of nitrogen content in soil with excellent reproducibility. BUCHI's DuMaster D-480 guarantees the demand for enhanced sample throughput, reduction of operational costs and minimization of human errors.

Solution «Dumas for environmental monitoring»
Combustion for unattended nitrogen analysis

60 or 120 position auto sampler plate

DuMaster D-480

Reductor-Regainer technology

Alternative solution: «Digestion & Distillation», page 12

<table>
<thead>
<tr>
<th>Scrubber K-415</th>
<th>SpeedDigester K-439</th>
<th>KjelFlex K-360</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four steps for occupational safety</td>
<td>The revolution in sample digestion</td>
<td>Broad application flexibility</td>
</tr>
</tbody>
</table>
Your most important benefits

**Unattended and fast**
- Rapid analysis times of approximately 4 minutes per sample
- High sample throughput due to fast and automatic sampler
- Unattended overnight operation of up to 300 samples per day
- Continuous operation thanks to stable calibration over months

**Cost effective**
- Low costs per sample thanks to:
  - high degree of automation
  - low-priced carbon dioxide as carrier gas as opposed to helium
  - up to 95% savings of oxygen due to automated oxygen control
- Maximized up times as result of innovative post combustion and Regainer-Reductor technology
- Highest productivity with 2,000 analyses per one pre-filled reduction tube

**Safe and convenient**
- Maximum safety: no contact with harmful chemicals or risk of burns
- Large sample volume (up to 1 g or 1 mL) analysis thanks to efficient multi-step gas drying
- Random access of samples at any time (no batch processing required)

Your solution «Dumas for environmental monitoring»

- Combustion: DuMaster D-480

**Customized application support**
- Authorized IQ/OQ documentation and preventive maintenance
- Practical workshops, training and seminars
- Minimize downtime thanks to our local support

«The DuMaster D-480 delivers the accuracy required whilst being easy to use. This combined with the low unit cost per sample fulfills our commercial needs.»
Jon Griffin, Public Analyst, Kent Scientific Services, United Kingdom
Solution «Reflux Digestion»
Determination of trace and heavy metals, and COD

You need to analyze heavy metals in soil, sewage sludge or electronic waste. With BUCHI’s solution “Reflux Digestion” you digest up to 12 samples simultaneously at homogeneous conditions to transfer the analyte into the measurable property for final ICP analysis or titration. The modular system configuration allows for various other applications like Kjeldahl and COD digestion.

Recirculating Chiller F-308
Water reflux setup

Scrubber K-415
QuadScrub<sup>ECO</sup>

COD setup for air reflux digestion

SpeedDigester K-439

Alternative solution for «Reflux Digestion»

Wet Digester B-440
Pre-incineration unit for ash determination
Your most important benefits

Range of applications
· Aqua regia, HNO₃ or HCl digestion under reflux (with water condensers) for heavy metal analyses, e.g. soils, sludge, sediments and electronic waste
· COD determination to evaluate the water quality using air condensers according to ISO 6060.
· Fast IR digestion for nitrogen determination according to Kjeldahl.

Flexible and fast
· Quick and easy switch between Kjeldahl and trace metal or COD digestion without laborious conversions.
· 20 ready-to-use pre-programmed methods for various sample matrices
· Storage of 30 personal methods

Safe and reliable operation
· No harmful fumes with the ultimate four stage Scrubber K-415 QuadScrubECO
· Safe and reproducible aqua regia digestion thanks to tight water reflux setup with efficient and water saving cooling (F-308)
· Excellent reproducibility thanks to superb thermal homogeneity and process supervision

Your solution «Reflux Digestion»

· Digestion: SpeedDigester K-439
· Setup: water or air reflux condenser setup
· Neutralization: Scrubber K-415 (QuadScrubECO)
· Cooling: Recirculating Chiller F-308

Options:
· SpeedDigester K-425 / K-436
· Comprehensive list of reference applications
· Customized application support
· Useful tools for application development
· Practical workshops, trainings and seminars
· Preventive maintenance including IQ/OQ/PQ

“The SpeedDigester is the ideal tool for dealing with medium sample loads for both TKN and heavy metal determinations.”
Municipal Sewage Plant, France
You are looking for the most efficient and sustainable way of parallel sample evaporation. Environmental soil, water, air and waste samples are usually extracted with an organic solvent which is subsequently concentrated before final analysis to overcome detection limits. Our time saving, flexible and highly efficient solution «Parallel Evaporation Pre-Analytical» guarantees maximum reproducibility and highest recovery rates.

**Solution «Parallel Evaporation Pre-Analytical»**
For concentration to a pre-defined volume

Vacuum Pump V-300
The economic and silent vacuum source

Interface I-300
Central control of all process parameters

Multivapor™ P-6 / P-12
Efficient evaporation for multiple samples

**Alternative solution for «Parallel Evaporation Pre-Analytical»**
Your most important benefits

Reliable
- No contamination thanks to inert materials
- No cross contamination due to individual sample sealing
- Highest analyte recoveries in combination with the Flushback module
- No loss of volatile compounds due to cooled appendix

Cost-efficient
- Increased productivity by concentrating up to 12 samples to a pre-defined residual volume in parallel
- Low operating cost due to independence of nitrogen
- Improved efficiency by combining SPE (Solid Phase Extraction) and concentration

Sustainable
- Environmental-friendly due to high solvent recovery
- No solvent emission
- No water consumption and disposal while using the eco friendly BUCHI chiller

Your solution «Evaporation Pre-Analytical»

- Syncore® Analyst with stand-alone condenser
- Recirculating Chiller F-314
- Vacuum Pump V-300 with Interface I-300 Pro
- Flushback module for 12 samples
- Solid Phase Extraction (SPE)

Options:
- Rack sizes (4, 6, 12 samples)
- SPE: Accessories for parallel SPE
- Customized application support
- Application booklet
- Workshops and trainings
- Minimize downtime thanks to our service hotline
- Preventive maintenance
- Service and documentation (IQ/OQ)

"After applying the most efficient Syncore® parameters for concentrations and solvent exchanges, you will be thinking of ways for your lab to afford the next unit."

Michael Dee, Technical Director, Fremont Analytical, USA
## The best solutions for your need
Comparison by customer need, application and characteristics

<table>
<thead>
<tr>
<th>Needs / Solutions</th>
<th>Extraction</th>
<th>Evaporation, concentration &amp; drying</th>
<th>SPE</th>
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<tbody>
<tr>
<td>«Extraction Throughput»</td>
<td>•</td>
<td>•</td>
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<tr>
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<td>«Parallel Evaporation Pre-Analytical»</td>
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### Soils / Sediments / Sewage sludge

<table>
<thead>
<tr>
<th>Matrices / Analyte</th>
<th>Pesticides, PAH, PFC, TPH</th>
<th>POPs as flame retardants, PCDD/PCDF, PCBs</th>
<th>Nitrogen, urea</th>
<th>Nitrates, nitrite, ammonia</th>
<th>Trace and heavy metals</th>
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</table>

### Waste / Hazardous waste

<table>
<thead>
<tr>
<th>Matrices / Analyte</th>
<th>PAH, PCBs</th>
<th>Phthalates</th>
<th>RoHS: trace metals, heavy metals</th>
<th>RoHS: flame retardants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

### Water / Waste water

<table>
<thead>
<tr>
<th>Matrices / Analyte</th>
<th>Pesticides, PAH, PCB, TPH</th>
<th>Hydro-carbon oil index</th>
<th>Nitrogen, urea</th>
<th>Nitrates, nitrite, ammonia</th>
<th>COD, phosphate</th>
<th>Phenol, cyanide, formaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

### Air / Fly ash

<table>
<thead>
<tr>
<th>Matrices / Analyte</th>
<th>Dioxins/furans and other POPs</th>
<th>Nitrates, nitrite, ammonia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

### Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. of samples per run</th>
<th>Tube size [mL]</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>6 / 4</td>
<td>10 – 120</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>120 / 200</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>20 – 3000</td>
</tr>
<tr>
<td></td>
<td>12 / 6</td>
<td>0.5 - 500</td>
</tr>
<tr>
<td></td>
<td>12 / 6</td>
<td>5 – 180</td>
</tr>
<tr>
<td></td>
<td>12 / 6</td>
<td>5 – 180</td>
</tr>
<tr>
<td>SpeedDigester</td>
<td>Distillation Units</td>
<td>KjelMaster System</td>
</tr>
<tr>
<td>--------------</td>
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</tbody>
</table>

**Sample Size**

- 6 or 12
- 20
- 1
- 1
- 1 / 24 / 48
- 60 / 120
- 100 / 300 / 500
- 300
- up to 1 g / 1 mL

*sample size
Does high pressure increase the extraction efficiency?

Yes, the combination of elevated temperature and pressure results in faster extraction compared to other extraction technologies. This is the result of an improved mass transfer because of higher analyte solubility and enhanced penetration. An increase from normal pressure $p_n$ to $p_2$ is thereby necessary to keep the sample in the liquid state at $T_2$.

Isn’t there any risk of cross-contamination for adjacent positions in the SpeedExtractor?

No, each position has its own inlet and outlet valve as well as individual pressure sensors. Even in case of blockage of one position, cross-contamination is excluded as an integrated troubleshooting wizard automatically relieves the pressure. All other positions will be finished while the faulty position is deactivated.

What is the benefit of a parallel extraction/evaporation approach?

Concerted parallel pressurized solvent extraction/parallel evaporation as opposed to a sequential approach increases the sample throughput. Additionally, it reduces the time to analysis significantly. An incoming batch of six samples is ready for the analysis after 115 minutes.

**BUCHI’s parallel approach**
1. Sample preparation per batch: 30 min
2. Parallel extraction per batch: ~45 min
3. Parallel evaporation per batch: ~40 min

**Start** 6 samples in 115 min
**Finish** 340 min

- 6 samples in 225 min less
- 6 times more samples within the same time period

**Others, sequential approach**
1. Sample preparation 6 samples: 30 min
2. Sequential extraction per sample: ~45 min
3. Parallel evaporation per batch: ~40 min

**Start**
**Finish** 340 min

- 6 batches versus 6 samples in 340 min
How can I apply higher sample quantities for extraction?

The B-811 LSV with the larger sample volume allows for higher quantities to reach the required detection limit of the analyte. The main glass parts are expanded to 60%.

What does “inert” mean for the Extraction System B-811?

In the B-811, all components in contact with the sample are inert. Contamination of the sample is prevented as leaching of additives from sealing membranes is eliminated. Additionally the extraction and drying process can be performed in an inert gas atmosphere.

When is it recommended to work with a recirculating chiller?

When you perform extraction or evaporation with a solvent like petroleum ether, a recirculating chiller (e.g. Recirculating Chiller F-308) should be implemented, especially if the tap water is warmer than 15 °C. The temperature difference between the boiling point of the solvent and the cooling water temperature should be 20 - 25 °C in order to achieve complete condensation of the solvent and to maintain an excellent solvent recovery.
Benefit from over 50 years of experience
Frequently asked questions

Is it possible to use the same digester for Kjeldahl, COD and aqua regia digestion?

Yes, the flexible SpeedDigester models can be adapted to several applications just by exchanging the accessories.

Can the COD sample tubes directly be transferred into an auto sampler for automated titration?

Yes, the same sample tubes can be used for sample preparation, digestion and automated titration.

Why is it important to use a K-415 QuadScrub\textsuperscript{ECO} (Scrubber with 4 cleaning stages) for aqua regia digestion?

Yes, only the fourth cleaning stage (D) reliably absorbs the toxic NO\textsubscript{x} fumes arising due to the reaction of aqua regia.

\begin{enumerate}
\item[A] Condensation step
\begin{enumerate}
\item Fumes in
\item Condenser
\item Condensate vessel
\item Cooling water inlet
\item Cooling water outlet
\end{enumerate}
\item[B] Neutralization step
\begin{enumerate}
\item Neutralization vessel
\end{enumerate}
\item[C] Adsorption step
\begin{enumerate}
\item Adsorption vessel
\end{enumerate}
\item[D] Reaction step
\begin{enumerate}
\item Reaction vessel
\item Pump
\end{enumerate}
\end{enumerate}

Which titrator types can be connected to the KjelFlex K-360?

The KjelFlex K-360 can be connected to different third party titrators of suppliers like Metrohm, Mettler Toledo, SI Analytics and Radiometer.
How does the BUCHI SPE solution work?

By just simply adding the SPE cover accessory, the parallel evaporation device Syncore® is upgraded to a fully functional parallel SPE/filtration device. Individual sample sealing, accurate vacuum control and vortex evaporation make the apparatus a highly efficient and comprehensive solution for modern sample preparation.

![Image]

What type of SPE cartridges/disks can be used?

The SPE platform can be used with any SPE or filtration cartridge or disk that has a standardized Luer adapter. This open design allows for using the best cartridge/disk possible for any given application, without limitation of proprietary consumables.

![Image]

Does the BUCHI SPE module allow for a 3-way-flow control?

Yes, the SPE advanced cover has up to 24 manually controllable 3-way valves that allow for conditioning into a waste container and consequent elution into the evaporation vessel at once. This combined functionality saves manual labor, costs and time, and reduces the risk of sample loss, spillage and contamination of the analyte.

![Image]
Dioxins in soil and air  
Sino-Japanese Friendship Center for Environmental Protection, China  
**Customer:** the center is founded by the Chinese and Japanese government. It is active in the environmental protection and analysis. The main focus lays on the POPs analysis in the environment.  
**Application:** determination of dioxins in soil, fly ash and air.  
**Equipment:** Extraction system B-811

PCB, dioxins and furans from soil and fly ash  
Marchwood Scientific Services, United Kingdom  
**Customer:** independent laboratory. They are the leading laboratory for dioxin analysis in the UK receiving samples from all over the world.  
**Application:** determination of PCBs, dioxins and furans in soil and fly ash.  
**Equipment:** SpeedExtractor E-916 with Rotavapor®

Organic contaminants in soil  
Ecological Institute of Binzhou University, China  
**Customer:** key ecological-environmental laboratory in the Yellow River Delta, soil research for protecting the ecosystem and the environment.  
**Application:** determination of TPH, PCBs, and POPs in different soils.  
**Equipment:** SpeedExtractor E-916 with SpeedExtractorRecord™

Sample preparation for trace analysis of PAHs in soil and groundwater using Syncore® Analyst  
Ecological Environmental Laboratory BECEWA, Nazareth, Belgium  
**Customer:** BECEWA belongs to Eurofins which is a group of laboratories active in 39 countries and represents more than 225 laboratories and 22,000 employees.  
**Application:** determination of TPH, PCBs, and POPs in different soil samples.  
**Equipment:** Syncore® Analyst R-12 for parallel evaporation of 12 samples to a pre-defined residual volume of 1 mL.

Explore more than 100 comprehensive case studies  
www.buchi.com/casestudies
TKN according to NEN-ISO 5663
AQUON, Netherlands

Customer: institute for water research, consultancy and analysis service for surface, ground water and waste water samples.

Application: determination of TKN in waste water according to NEN-ISO 5663


Ammoniacal nitrogen and phenol in waste water
JSW Steel Ltd, Bellary, Karnataka, India

Customer: JSW is a leading steel company.

Application: determination of ammoniacal nitrogen and phenols in waste water to control the production process and monitor the quality of waste water released into the environment.

Equipment: Distillation Unit K-355

EPA method 8020
Phoenix Environmental Laboratories, USA

Customer: offers high quality testing of soils, water, sludge, and solids meeting EPA, state DEP and DOH requirements.

Application: determination of concentrations of polychlorinated biphenyls (PCBs) in extracts from solid and aqueous matrices.

Equipment: The Syncore® Analyst R-12 with Flushback Module, Vacuum Pump V-700, Vacuum Controller V-855 and Recirculating Chiller F-108

Water analysis
Laboratory of Metropole Européenne de Lille, France (Veolia Group)

Customer: Veolia designs and delivers services that are vital to human development and sustainable performance through three complementary business activities: water management, waste management and energy services. The company provides innovative, sustainable solutions to improve people’s everyday lives and protect future resources.

Application: determination of trace metals by aqua regia digestion

Equipment: SpeedDigester K-439 with water-reflux setup
Complete your extraction portfolio
Complementary and related products

**Pressurized Extraction**

The SpeedExtractor E-914 excels in pressurized solvent extraction (PSE) for the determination of residues, contaminants and additives.

**Parallel Evaporation**

The Multivapor™ is a compact 6 or 12 position parallel vortex evaporator that is designed to optimize existing personal process workflows.

**Rotary Evaporation**

The Rotavapor® R-300 is the product of choice for gentle evaporation of large volumes of extracts coming from the B-811 LSV or the E-914.

**KjelMaster K-375**

The KjelMaster K-375 meets the highest demands in usability, automation, user administration and sophisticated data management.

**Distillation Unit K-350 / K-355**

Perform Kjeldahl nitrogen or protein determinations compliant to officially approved methods in the most cost effective way. Expand your range of applications with the additional features of the K-355.

**KjelDigester K-446 / K-449**

The manual K-446 is an entry level block digester with effortless manual control and rack handling of up to 20 samples. The fully automated model K-449 offers a convenient automatic lift for raising and lowering the sample tube rack.

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Recirculating Chiller

Sustainable cooling in accordance with economical and ecological needs is achieved with the Recirculating Chillers F-308 and F-314.

Glassware

BUCHI precision glass vessels stand for extended lifetime, trouble-free operation, and safe processing. Various vessels are compatible for both PSE and evaporation.

Chemicals for Extraction

Use the BUCHI approved extraction sand and diatomaceous earth for reliable operation and effective drying.

Scrubber

The Scrubber K-415 with up to four cleaning steps provides maximum safety for operator and environment.

Kjeldahl Sample Tubes

BUCHI precision sample tubes stand for extended lifetime, trouble-free operation even with foamy or splashy samples, and safe processing.

Kjeldahl Tablets

Our high quality Kjeldahl Tablets guarantee reproducible digestion and consider ecological and economical aspects.
Support and customer service
From feasibility to preventive maintenance

You value an efficient and personalized service. Our network of professional application specialists and service technicians as well as a large number of satisfied customers around the world give you the assurance that you are working with the right partner.

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