



## **Solutions for Environmental Analysis** Enhancing productivity & quality in lab routine

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.



## **Core messages to our customers**

BUCHI creates added value with “Quality in your hands”

“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.



### **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.



## Ingenious solutions for your matrices

Covering a wide variety of analytes

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.

### Soil, sludge, sediment



**Analyte:**

PCDD/PCDF, PAH, PCB, flame retardants (BFR, PBDE), TPH, pesticides, Total Kjeldahl Nitrogen (TKN), trace and heavy metals, ammonia

**Matrix:**

soil, sediments, sludge, brownfields

**Compliant with e.g.:**

- EPA 1613B      ISO 10382
- EPA 1664      ISO 11261
- EPA 1668B     ISO 11466
- EPA 3540C     ISO 13859
- EPA 3541      ISO 16703
- EPA 3545A     ISO 18287
- EPA 8082A     DIN ISO 11261
- EPA 8290A     EN 13342
- EPA 8270      DIN 13346
- EPA 9071      DIN 38414

### Waste



**Analyte:**

Restriction of hazard substances (RoHS): PBDE and PBB, lead and cadmium from electrical and electronic products, trace and heavy metals

**Matrix:**

e-waste, recycled material, polymer waste, bio waste

**Compliant with e.g.:**

- EPA 8270
- IEC 62321
- Directive 2002/95/EC
- EN 14039
- EN 15308
- DIN EN 13657
- ISO 16797



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, runoff from fertilized lawns, animal manure and storage areas

### Compliant with e.g.:

EPA 608	ISO 5663
EPA 8081	ISO 9377-2 (DIN H53)
EPA 8082A	DIN 38406-E5-2
EPA 9010C	DIN 38409
EN 38414-20	NEMI D6303
AOAC 973.48	

## 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](http://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.

Solutions by BUCHI	Page	Analytes and parameter groups	Soil Sludge Sediment	Waste	Water / Waste Water	Air
«Extraction Throughput»	8	Pesticides, PAH, PFC, TPH, phthalates, POPs as flame retardants (BFR), PCDD/PCDF, PCB	●	●		●
«Extraction Universal»	10	Pesticides, PAH, PFC, TPH, phthalates, POPs as flame retardants (BFR), PCDD/PCDF, PCB	●	●		●
«Digestion & Distillation»	12	TKN, urea, ammonia, nitrate, nitrite, cyanide, formaldehyde, phosphate	●		●	●
«Dumas for environmental monitoring»	14	Nitrogen	●			
«Reflux Digestion»	16	Trace and heavy metals, COD	●	●	●	
«Parallel Evaporation Pre-Analytical»	18	Pesticides, PAH, PFC, TPH, phthalates, hydro-carbon oil index, CHC/HCH, PCB, DDT, PAH, POPs as flame retardants (BFR), PCDD/PCDF	●	●	●	●



Soil,  
sludge,  
sediment



Water /  
waste water



Waste



Air

Sampling	Homogenization Grinding Sieving	Digestion Separation Combustion Extraction	Evaporation Concentration Distillation	Clean-up	Analysis
•	•	Extraction	Concentration	(•)	GC/MS HR-GC/HR-MS LC/MS
•	•	Extraction	Concentration	(•)	GC/MS HR-GC/HR-MS LC/MS
•	•	Digestion	Distillation		Titration
•	•	Combustion			TCD
•	•	Digestion			ICP (metals) Titration (COD)
			Concentration	(•)	GC/MS HR-GC/HR-MS LC/MS

• inherent step (•) optional

Find your solutions at:  
[www.buchi.com/environmental](http://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.



Air sample on polyurethane foam (PUF)



SpeedExtractor E-916



Syncore® Analyst R-12 with flushback module

Vacuum Pump V-300



Recirculating Chiller F-308



Custom glassware

Alternative solution: «Extraction Universal», page 10

Extraction System B-811  
 Four compliant and versatile extraction methods

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

### 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.

Recirculating Chiller F-308



Extraction System B-811



Syncore® Analyst R-12  
with flashback module



Vacuum Pump V-300



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

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*“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

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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 combining 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<sub>2</sub>O<sub>2</sub>
- 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

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*“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

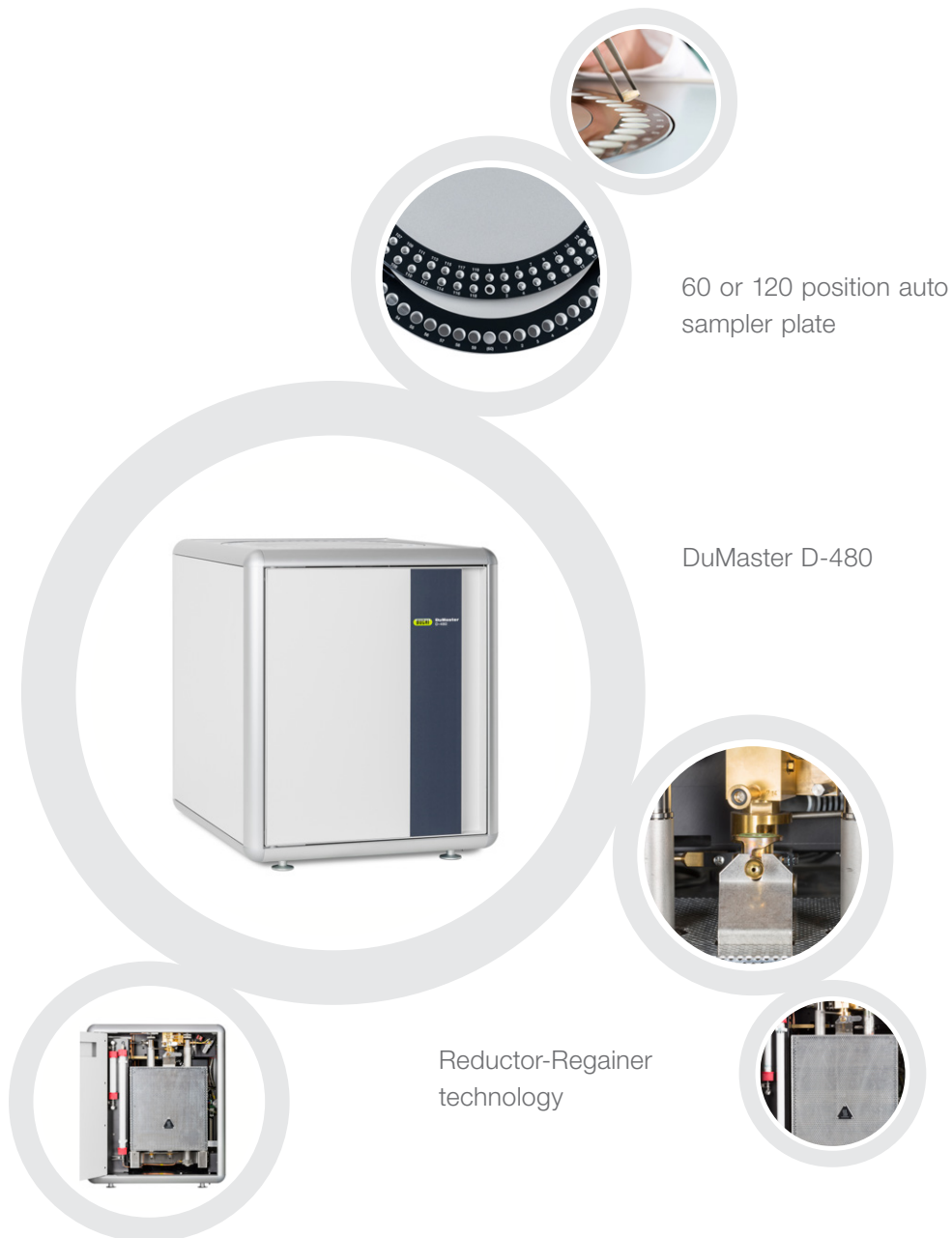
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## Solution «Dumas for environmental monitoring» Combustion for unattended nitrogen analysis



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.



Alternative solution: «Digestion & Distillation», page 12

Scrubber K-415  
Four steps for occupational safety

SpeedDigester K-439  
The revolution in sample digestion

KjelFlex K-360  
Broad application flexibility



## 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



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



Water reflux  
setup



SpeedDigester K-439



COD setup for air  
reflux digestion

### Alternative solution for «Reflux Digestion»

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Wet Digester B-440  
Pre-incineration unit for ash  
determination

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## Your most important benefits

### Range of applications

- Aqua regia,  $\text{HNO}_3$  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 QuadScrub<sup>ECO</sup>
- 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 (QuadScrub<sup>ECO</sup>)
- 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

## Solution «Parallel Evaporation Pre-Analytical»

For concentration to a pre-defined volume



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.

Analyst tube with appendix



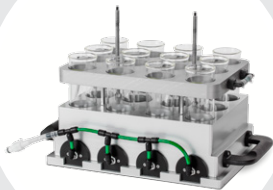
Interface I-300 Pro



Vacuum Pump V-300



Syncore® Analyst



Flushback module for 12 samples



Recirculating Chiller F-314



Solid Phase Extraction (SPE)

### Alternative solution for «Parallel Evaporation Pre-Analytical»

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

## 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



	Speed-Extractor E-914 / E-916	Extraction System B-811	R-300 «Dynamic»	Syncore® Analyst R-12 / R-6	Multivapor™ P-12 / P-6	SPE Module Syncore® Analyst
<b>Needs / Solutions</b>	Extraction		Evaporation, concentration & drying			SPE
«Extraction Throughput»	•			•		
«Extraction Universal»		•		•		
«Digestion & Distillation»						
«Dumas for environmental monitoring»						
«Reflux Digestion»						
«Parallel Evaporation Pre-Analytical»				•		•
<b>Soils / Sediments / Sewage sludge</b>						
Pesticides, PAH, PFC, TPH	•	•	•	•	•	
POPs as flame retardants, PCDD/PCDF, PCBs	•	•	•	•	•	
Nitrogen, urea						
Nitrate, nitrite, ammonia						
Trace and heavy metals						
<b>Waste / Hazardous waste</b>						
PAH, PCBs	•	•	•	•	•	
Phthalates	•	•	•	•	•	
RoHS: trace metals, heavy metals						
RoHS: flame retardants	•	•	•	•	•	
<b>Water / Waste water</b>						
Pesticides, PAH, PCB, TPH			•	•	•	•
Hydro-carbon oil index				•		•
Nitrogen, urea						
Nitrate, nitrite, ammonia						
COD, phosphate						
Phenol, cyanide, formaldehyde						
<b>Air / Fly ash</b>						
Dioxins/furans and other POPs	•	•	•	•	•	
Nitrate, nitrite, ammonia						
<b>Characteristics</b>						
No. of samples per run	6 / 4	4	1	12 / 6	12 / 6	12 / 6
Tube size [mL]	10 – 120	120 / 200	20 – 3000	0.5 - 500	5 – 180	5 – 180

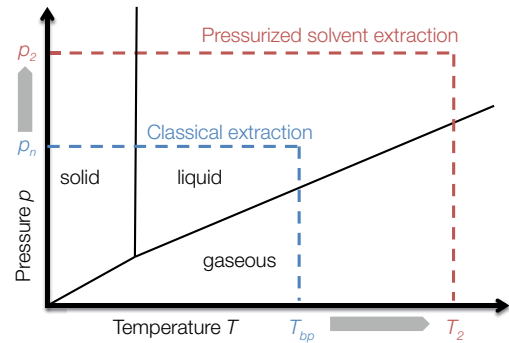
Matrices / Analyte





### 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  $T_2$ .

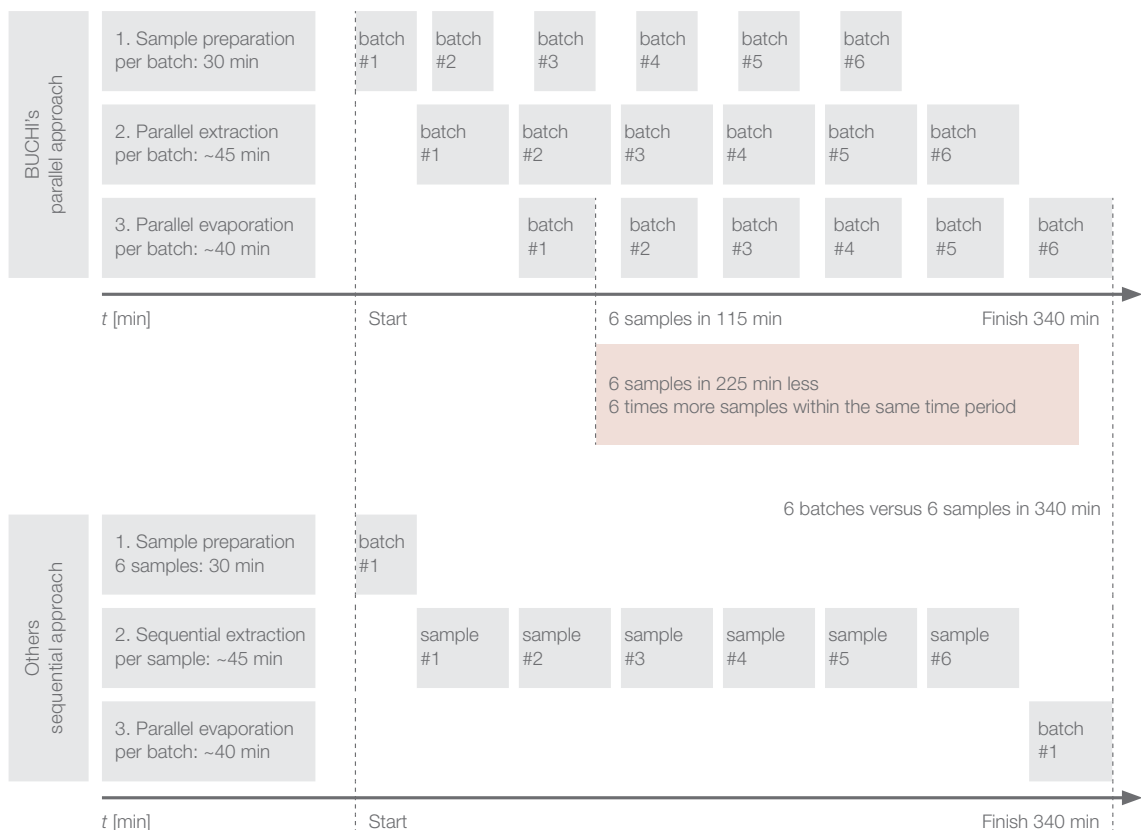


### Isn't there any risk of cross-contamination for adjacent positions in the SpeedExtractor?

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.

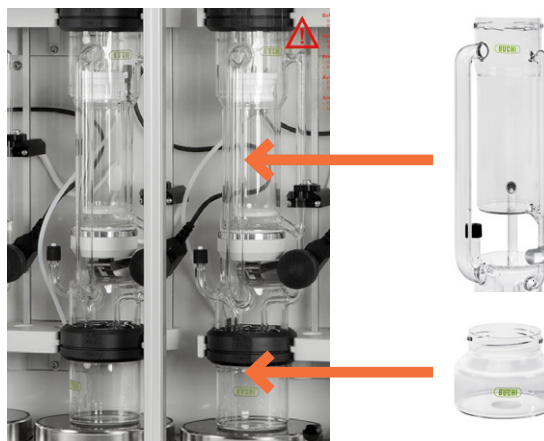
### What is the benefit of a parallel extraction/evaporation approach?

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.



## 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 %.



Standard

LSV

## 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.



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<sup>ECO</sup> (Sscrubber with 4 cleaning stages) for aqua regia digestion?

Yes, only the fourth cleaning stage (D) reliably absorbs the toxic NO<sub>x</sub> fumes arising due to the reaction of aqua regia.

**A** Condensation step

- ① Fumes in
- ② Condenser
- ③ Condensate vessel
- ④ Cooling water inlet
- ⑤ Cooling water outlet

**B** Neutralization step

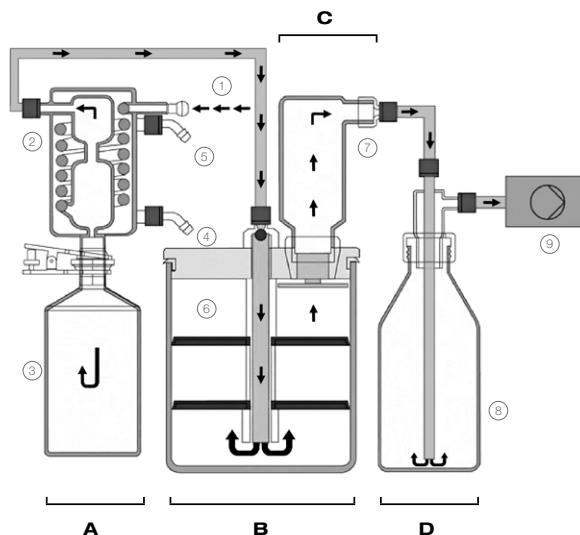
- ⑥ Neutralization vessel

**C** Adsorption step

- ⑦ Adsorption vessel

**D** Reaction step

- ⑧ Reaction vessel
- ⑨ Pump



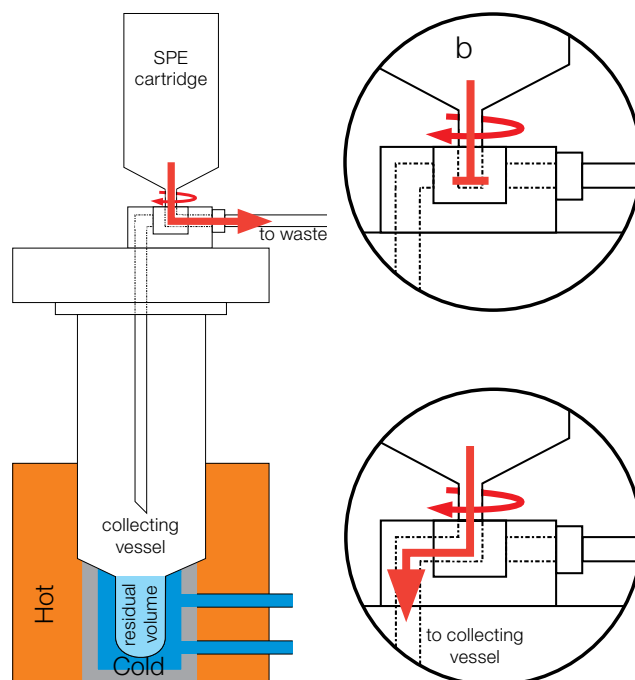
Which titrator types can be connected to the KjellFlex K-360?

The KjellFlex 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.



## 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.

## 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.







#### 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

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#### 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®

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#### Organic contaminants in soil

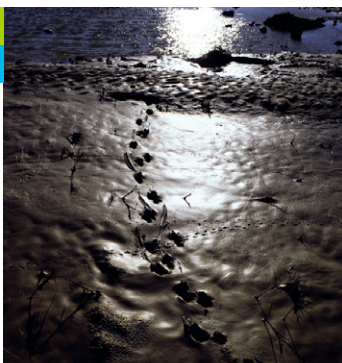
Ecological Institute of Binzhou University, China

**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™

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#### 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.

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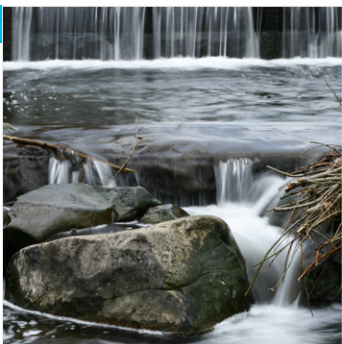


**TKN according to NEN-ISO 5663**  
AQUON, Netherlands

**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

**Equipment:** KjellMaster System K-375 / K-377, KjellDigester K-449 and Scrubber K-415



**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

## 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.

## 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.



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