

# Speed Extractor



# New dimensions in high pressure extraction

**The new SpeedExtractor is revolutionising pressurized solvent extraction: 6 samples in only 20 minutes, and that with minimum solvent consumption. Economical and ecological advantages combined, what more do you want?**

## Results conveniently and quickly

Thanks to high temperatures and pressures, solvent extraction can be undertaken very efficiently in a short time. Nevertheless, it is still often the time limiting factor during sequential sample processing.

The unique concept of the new SpeedExtractor achieves a new time dimension. Up to 6 samples can be extracted not one after the other, but at the same time in completely separate cells. The result: 6 extracts in only 20 minutes!

The SpeedExtractor also makes day-to-day work easier. The automatic sealing of the extraction cells, the easy operation and the flexible process parameters make the work not only convenient, but also safe and of versatile application.

## The advantages at a glance

- Unmatched speed: 6 samples in 20 minutes, 96 samples in a working day
- Low running costs: 5–200 ml solvent per sample
- High level of automation reduces the number of user actions and increases safety
- Integrated flushing process into a separate waste vessel makes cleaning easier

- Unique flexibility in relation to volume (10–120 ml cells; 60, 220, 240 ml round-bottom bottles and flat-bottom vials) and type of sample thanks to flexible process parameters (30–200 °C, 50–150 bar)

## An overview of the E-916 and E-914

The SpeedExtractor is available in two configurations: E-916 and E-914. They differ in the size of the extraction cells (E-916 up to 40 ml, E-914 up to 120 ml) and therefore in the number of samples that can be processed simultaneously.

	E-916	E-914
<b>Number of samples</b>	6	4
<b>Extraction cells</b>	10, 20, 40 ml	40, 80, 120 ml
<b>Collection bottles</b>	60, 220, 240 ml	
<b>Mixer</b>	2 or 4 solvents	



# 10 unique features

3

**The SpeedExtractor makes day-to-day work in the laboratory easier due to unmatched ease of use and efficiency, is of versatile and flexible application and ensures a high level of safety without restrictions.**

## Ease of use

The SpeedExtractor is easy and intuitive to operate. This feature minimises training effort and eliminates potential sources of error.



### Convenient and safe

The extraction cells are automatically sealed using a unique sealing principle. This feature saves time-consuming preparation and increases safety.



### Flushing made simple

During system cleaning the flushing solution can be fed directly to a waste vessel. The use of new collection bottles for the flushing solution is therefore unnecessary.

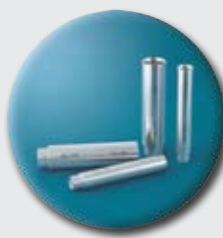


### Extraction at the press of a button

At the press of a button an established extraction method can be applied simultaneously to up to 6 samples. Simply unbeatable ease of use.

## Flexible

The wide selection of process parameters permits versatile usage in a very wide range of applications.



### 10 – 120 ml samples

Thanks to different extraction cells it is possible to optimise the amount of solvent for each sample size.

E-916: 10, 20, 40 ml

E-914: 40, 80, 120 ml



### Different collection bottles

As required, the flexible collection unit can be used with 60, 220 or 240 ml round-bottom bottles or flat-bottom vials that is also compatible with the parallel evaporator Multivapor.



### Integrated mixer

Solvent mixtures can be prepared as required using the integrated 2 or 4-port mixer. A clever, compact solution.

## Economically and ecologically expedient

The low solvent consumption and the high level of automation reduce the running costs and make a valuable contribution to the environment.



### Low solvent consumption

Pure efficiency: 6 extractions in 20 – 40 minutes with only 5 – 200 ml of solvent per sample.



### Save energy with Eco mode

When operated in the Eco mode, the heating is automatically switched off after extraction is completed to save energy and costs.

## Safe and reliable

Intelligent safety mechanisms ensure safe, unrestricted working even at high pressures and temperatures.



### Safe process control

Various automatic process checks simplify and safeguard operation. An ingenious IQ/OQ software package ensures the device functions correctly.

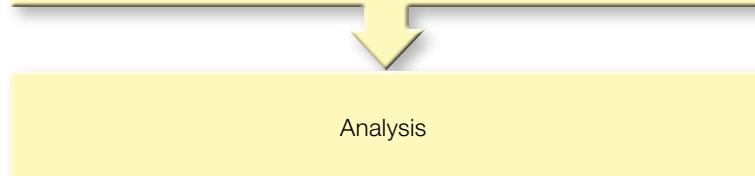
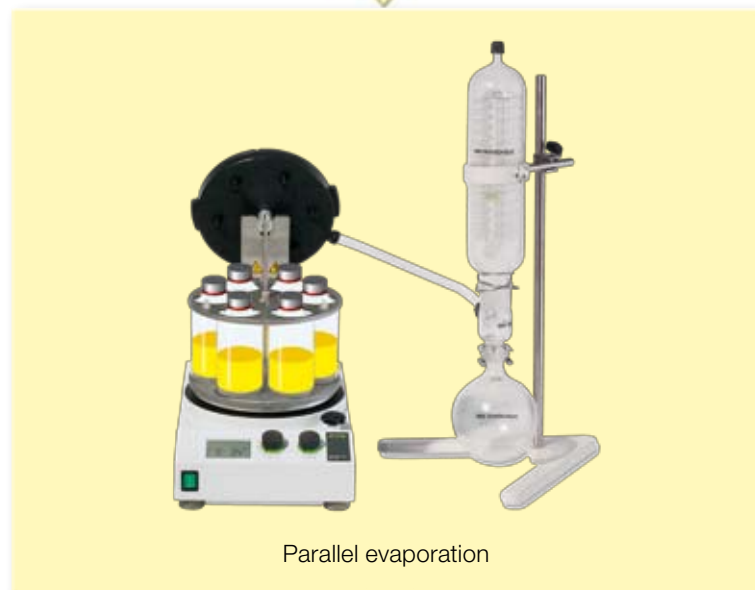
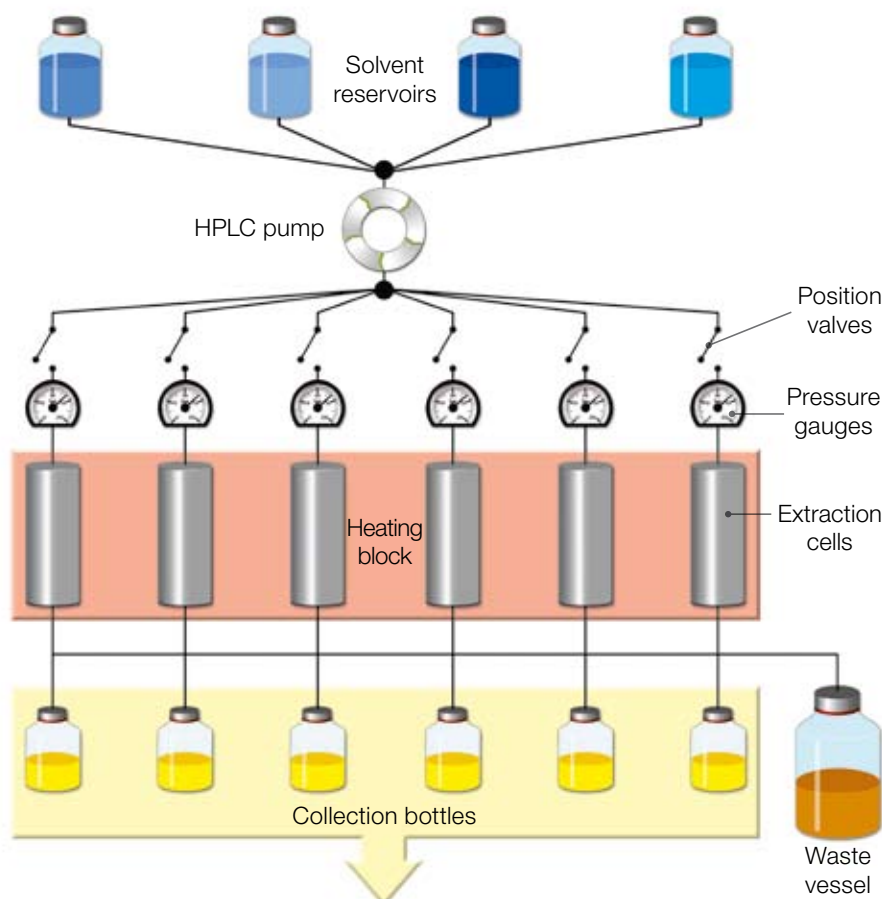


### Reliable recording

The SpeedExtractorRecord™ software records all process parameters and any external intervention and provides complete reporting at the press of a button.

# The small 1-by-6 in extraction technology

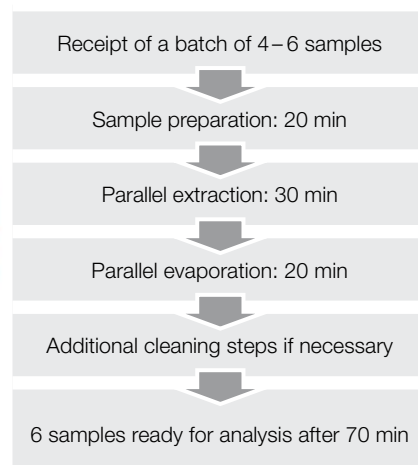
The parallel pressurized solvent extraction provides two significant advantages: on the one hand the time from the receipt of a batch of samples to the analysis result can be drastically reduced, on the other hand the sample throughput can be increased several times over.



## Making six from one

The solvent mixture is transferred into separate extraction cells by a pump at high pressure (<150 bar) and heated (<200 °C). The extracts are collected in vials and can be evaporated in parallel immediately on the parallel evaporator Multivapor without sample transfer. As a result 6 samples are processed in one run in exactly the same conditions. Two examples demonstrate the advantages:

### 1 Quick results



### 2 High throughput

	Operating hours	
	1 shift / 8 hrs.	3 shifts / 24 hrs.
<b>Runs*</b>	480 : 30 = 16 runs	1440 : 30 = 48 runs
<b>Sequential approach</b>	16 x 1 = 16 samples	48 x 1 = 48 samples
<b>Parallel approach</b>	16 x 6 = 96 samples	48 x 6 = 288 samples
<b>Capacity increase</b>	600 %	600 %

\* with an averaged extraction time of 30 min



# Wide range of applications thanks to flexible process parameters

The flexible sample volume and the wide range of process parameters make it possible to use the SpeedExtractor in a very wide range of applications: from trace analysis to quality control, from 1 ml to 120 ml sample size, with a simple or very complex matrix.



## Environmental analysis

High pressure extraction is used for a wide range of applications in environmental analysis. Recognition by the US EPA method SW-846 3545 and SW-846 6860 reflects the excellent results in comparison to classic Soxhlet extraction. The following analytes are particularly suitable: PAH, BNA, PCB, dioxins and furanes, TPH, pesticides and many more.



## Foodstuff analysis

Along with the determination of fat in foodstuffs, high pressure extraction is recognised by European and Asian countries for the determination of pesticide, dioxin or furane residues and flavourings. The E-914 is particularly suitable for these applications, as the low detection limits often require large sample sizes (80–120 ml).



## Plastics and their additives

The classic extraction of polymers requires very long extraction times (12–24 hrs.) and large amounts of solvent. The SpeedExtractor is the ideal solution for the quality control of batch processes, as the extracts for an entire batch are available in a very short time. The method is particularly suitable for the extraction of softeners or additives, and also for the characterisation of polymer structures.



## Pharmaceuticals and natural products

The wide pressure and temperature range and the ability to make up solvent mixtures as required are particularly advantageous especially for the identification of actives in pharmaceutical products or for natural product extraction, as the extraction can be performed gently and quickly. Typical applications are quality control of actives in natural products or pharmaceutical products or research on new actives in plant materials.

PAHs from certified soil sample [ng/g]		
Compound	SpeedExtractor (EPA3545/8100)	Soxhlet (EPA8270)
Acenaphthene	810	805
Fluorene	640	627
Anthracene	275	265
Fluoranthene	816	785
Benzo(a)anthracene	291	286
Benzo(a)pyrene	62	60
Dibenzo(a,h)anthracene	303	288
Benzo(g,h,i)perylene	246	232
Time	2 x 5 min	16 hours

Recoveries of fat from fresh meats		
Sample	SpeedExtractor	Soxhlet
Frankfurter	30.92 ± 0.09 (RSD 0.29%)	29.46 ± 0.21 (RSD 0.71%)
Turkey Breast (low fat)	1.4 ± 0.22 (RSD 15.60%)	1.07 ± 0.10 (RSD 9.34%)
Turkey Breast (oven roasted)	0.7 ± 0.04 (RSD 5.4%)	0.65 ± 0.03 (RSD 4.6%)
Method parameters		
Dry time / sample	4 min	90 – 120 min
Extraction time / sample	20 min	4 – 6 h
Solvent consumption / sample	25 ml	175 ml

Extraction of Jin Ci Tau (St. John's Wort)		
Results	SpeedExtractor	DAC 86
% Dianthrone (calc. at hypericin)	0.035 ± 0.001	0.028 ± 0.002
Extraction time	15 min	540 min
Solvent consumed	60 ml	200 ml

Method parameters for 2.0 g sample			
Step 1	Solvent#1	CH <sub>2</sub> Cl <sub>2</sub> (100 °C, 100 bar)	CH <sub>2</sub> Cl <sub>2</sub>
	Solvent volume	20 ml	100 ml
	Extraction time	5 min	240 min
Step 2	Solvent	MeOH (100 °C, 100 bar)	Acetone
	Solvent volume	40 ml	100 ml
	Extraction time	10 min	300 min

# SpeedExtractor to suit your needs

The SpeedExtractor is available in 8 different configurations. For small samples (up to 40 ml) the E-916 is recommended, for large samples (from 40 ml) the E-914. Both types are equipped with a 2 or 4-port mixer and a set of extraction cells each.

SpeedExtractor configurations			Order no.
6 samples up to 40 ml E-916	2-port mixer	10 ml cells	053360
		20 ml cells	053361
		40 ml cells	053362
	4-port mixer	10 ml cells	053363
		20 ml cells	053364
		40 ml cells	053365
4 samples from 40 ml E-914	2-port mixer	40 ml cells	053370
		80 ml cells	053371
		120 ml cells	053372
	4-port mixer	40 ml cells	053373
		80 ml cells	053374
		120 ml cells	053375



Included in the scope of delivery are the following parts: choice of 6 extraction cells with plug screw and extraction cell gripper, all tools including plunger and brush, funnel, replacement seals (12 pcs. each), replacement support rings (2 pcs.), paper filters for top and bottom (100 pcs. each), metal frits (25 pcs.),

extra plug screws (2 pcs.), replacement fittings and ferrules (10 pcs. each), FEP tubing (5 m), suction filter (2 pcs.), one solvent vessel with GL45 lid (1 l), collection bottles with lid and septa (240 ml, 6 pcs.) and extraction sand (2.5 kg).

## In six steps from sample preparation to parallel evaporation

1

Convenient packing of the extraction cells with a funnel ideally matched to the cell size.

2

The heating block can be simply pulled out and the extraction cells fitted using the extraction cell gripper.

3

The protective shield is closed, the cells sealed automatically and 6 samples are extracted at the push of a button.

4

The extracts are collected simultaneously in collection bottles. The entire unit can be removed in one action.

5

The collection bottles can be transferred directly – i.e. without sample transfer – to the parallel evaporator Multivapor P-6.

6

The flexible sealing system in the Multivapor makes it possible to individually seal all three collection bottles (60, 220 and 240 ml). Cross-contamination is therefore excluded.



## Extraction cells

The extraction cells for the E-916 and E-914 are available in three different volumes.

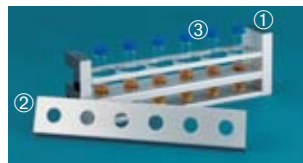
Order no.		
Volumes	E-916	E-914
10 ml	51237	–
20 ml	51236	–
40 ml	51235	51234
80 ml	–	51233
120 ml	–	51232



## Carrier for extraction cells

The carrier for the extraction cells is used for sample preparation and ensures the hot cells do not fall over.

Order no.	
Carrier for cells E-916	53690
Carrier for cells E-914	53691



## Collection unit

The collection unit ① is compatible with the 220 and 240 ml vessels. With the aid of the retaining plate ② 60 ml vials ③ can also be used.

Order no.	
① Collection bottle carrier	51323
② Retaining plate for 60 ml vials (2 pcs.)	11055205



## Sand and diatomaceous earth

Sand and diatomaceous earth are used for loosening and homogenising the sample or as a drying agent.

Order no.	
Sand (2.5 kg)	37689
Diatomaceous earth (1kg)	53201



## Plungers

The clean packing of the thimbles will extend their service life and produce better results. The plunger makes it easier to seal the sample with a frit. A plunger is included in the scope of delivery.

Order no.	
Plunger for E-916	53037
Plunger for E-914	53038



## Extraction cell grippers

With the aid of the extraction cell gripper, even extraction cells at 200°C can be conveniently transferred from the heater to the carrier. One gripper is included in the scope of delivery.

Order no.	
Gripper for E-916	53030
Gripper for E-914	53026



## Collection vessels

60 ml and 240 ml narrow neck flat-bottom vials ①, ③ and 220 ml GL45 round-bottom bottles ② are available as collection vessels.

Order no.	
① 60 ml, flat (72 pcs.)	49535
② 220 ml, round (6 pcs.)	53207
③ 240 ml, flat (6 pcs.)	52672



## IQ/OQ

An ingenious service software package and independent temperature and pressure measurement ensure correct operation in the context of an IQ/OQ.

Order no.	
OQ documentation	93292
IQ/OQ kit	11055354



## Expansion elements and funnels

Expansion elements are the ideal accessory for quick function tests, without consuming too much solvent in the process. The funnels make it easier to add the sample. One funnel type is included in the scope of delivery.

Order no.		
Volumes	Ex. element	Funnel
10 ml	53359	53035
20 ml	53358	53396
40 ml E-916	53357	53397
40 ml E-914	53357	53036
80 ml	53356	53036
120 ml	53355	53036



## Sealing parts

To achieve good sealing, the seals ① and PEEK rings ② must be replaced regularly. The metal frit ③ can clog, and on the screw cap ④ the thread must be intact.

Order no.		
Seal top (12 pcs.)	53669	53671
Seal bottom (12 pcs.)	53670	
PEEK ring (2 pcs.)	53666	53667
Screw cap (2 pcs.)	53209	
Metal frit (25 pcs.)	49568	



## Disposable items

The cellulose frits must be replaced after each sample. The weighing boats considerably ease the filling of the extraction cells.

Order no.	
Frit E-916 top (100 pcs.)	49572
Frit E-914 top (100 pcs.)	51249
Frit E-916/914 bottom (100 pcs.)	49569
Weighing boat (250 pcs.)	53202



## Extraction thimbles

Extraction thimbles prevent clogging of the metal frits with fine particle samples. They are made of cellulose and available in quantities of 25 pcs.

Order no.		
Thimble for:		
E-916	40 ml cell	11055334
E-914	40 ml cell	11055334
E-914	120 ml cell	11055358

# Complete documentation and method preparation with SpeedExtractorRecord™

The PC software SpeedExtractorRecord™ offers the following advantages:

- Preparation, editing and saving of any number of extraction methods
- Online process display of all activities
- Graphic display of temperature and pressure curves for the different extraction cycles
- Recording of all unexpected events such as pause, blockage of the cell,

changing of the extraction vessels etc.

- PDF reporting of all process parameters, events, p,T-time curve, sample and operator information
- CSV export feature for graphics in own publications

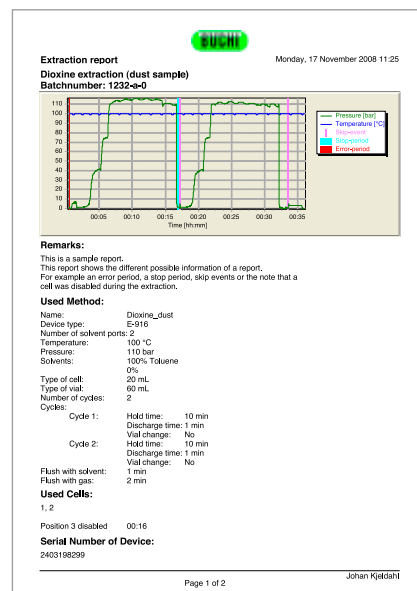
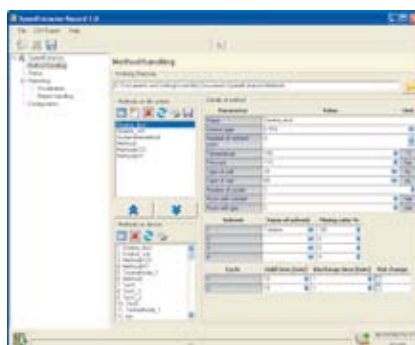
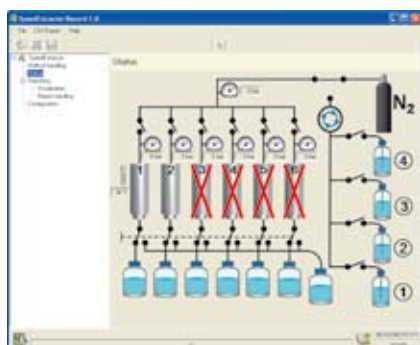
A CD-ROM with demo licence for 60 days is included in the scope of delivery. The communication with the device is via a USB port.

Order no.

SpeedExtractorRecord™

CD-ROM with licence

53073



## Technical data

Dimensions (W x H x D)	670 x 725 x 500 mm
Weight	90 kg
Power consumption	max. 1750 W
Supply voltage	100–240 VAC ± 10 %, 50–60 Hz
Temperature range	50–200 °C ± 3 °C
Pressure range	50–150 bar ± 5 bar
Laboratory nitrogen connection	5–10 bar; purity 4.5–5.0
Solvent mixer	4-port, 2-port mixer

Flow rate of the HPLC pump	0.01–50 ml/min ± 2 %
Size of the extraction cells	E-916: 10, 20, 40 ml; E-914: 40, 80, 120 ml
Size of the collection bottles	60, 220, 240 ml
Material with solvent or sample contact	EP, FFP, PEEK, PTFE, metal, ceramic, glass
Interface	USB 2.0
Protection class	IP21
Approvals	CE, CSA

BÜCHI Labortechnik AG  
Postfach  
9230 Flawil 1  
Schweiz  
T +41 71 394 63 63  
F +41 71 394 65 65  
buchi@buchi.com  
www.buchi.com

BÜCHI Labortechnik GmbH  
Postfach 10 03 51  
45003 Essen  
Deutschland  
Freecall 0800 414 0 414  
T +49 201 747 490  
F +49 201 237 082  
deutschland@buchi.com  
www.buechigmbh.de

BÜCHI Labortechnik GmbH  
Branch Office Netherlands  
Postbus 142  
3340 AC Hendrik-Ido-Ambacht  
The Netherlands  
T +31 78 684 94 29  
F +31 78 684 94 30  
netherlands@buchi.com  
www.buchi.nl

BÜCHI Italia s.r.l.  
Centro Direzionale, Milano Fiori  
Pal. A-4, Strada 4  
20090 Assago (MI)  
Italia  
T +39 02 824 50 11  
F +39 02 57 51 28 55  
italia@buchi.com  
www.buchi.it

BUCHI India  
Private Ltd.  
201, Magnum Opus  
Shantinagar Industrial Area  
Vakola, Santacruz (East)  
Mumbai 400 055,  
India  
T +91 22 667 18983 / 84 / 85  
F +91 22 667 18986  
www.buchi.com

BUCHI (Thailand) Ltd.,  
77/121, Sin Sathon Tower,  
28th FL, Unit C  
Krunghthongburi Rd.  
Klongtong, Klongsan  
Bangkok 10600  
Thailand  
T +66 2 862 08 51  
F +66 2 862 08 54  
bacc@buchi.com  
www.buchi.com

BUCHI Corporation  
19 Lukens Drive, Suite 400  
New Castle  
Delaware 19720  
USA  
T +1 302 652 3000  
F +1 302 652 8777  
Toll Free: +1 877 692 8244  
us-sales@buchi.com  
www.mybuchi.com

BUCHI Hong Kong Ltd.  
1810 Fortress Tower  
250 King's Road  
North Point, Hong Kong  
China  
T +852 2389 2772  
F +852 2389 2774  
china@buchi.com  
www.buchi.com.cn

BUCHI Shanghai Trading LLC  
21/F Shanghai Industrial  
Investment Building  
18 Caoxi Bei Road  
200030 Shanghai  
China  
T +86 21 6468 1888  
F +86 21 6428 3890  
china@buchi.com  
www.buchi.com.cn

BUCHI UK Ltd  
5 Whitegate Business Centre  
Jardine Way  
Chadderton  
Oldham OL9 9QL  
United Kingdom  
T +44 161 633 1000  
F +44 161 633 1007  
uk@buchi.com  
www.buchi.co.uk

BUCHI Sarl  
5, rue du Pont des Halles  
Z.A. du Delta  
94656 Rungis Cedex  
France  
T +33 1 56 70 62 50  
F +33 1 46 86 00 31  
france@buchi.com  
www.buchi.fr

Nihon BUCHI K.K.  
3F IMON Bldg.,  
2-7-17 Ikenohata, Taito-ku,  
Tokyo 110-0008  
Japan  
T +81 3 3821 4777  
F +81 3 3821 4555  
nihon@buchi.com  
www.nihon-buchi.jp

We are represented by more than 100 distribution partners worldwide. Find your local representative at

www.buchi.com

Quality in your hands