DSP systems

The missing link in your laboratory!

Fully Automated
Sample Preparation System
for POPs Analysis

Features

This system provides advantages

The Fully Automated Sample Preparation System DSP-Systems provides will ease the problems with your current Dioxin and PCB analysis. This system has been developed based on sophisticated technologies and more than 20 years of expertise in Japanese laboratories. It meets strict accuracy management criteria and provides the highest satisfaction.

Extraction

Features and Benefits of Dioxin analysis

• **Less than 100ml of solvent per sample**
It uses only 85ml of Hexane and 3ml of Toluene. No Dichloromethane. This instrument is both user and eco friendly.

• **No cross contamination in valveless system**
Dioxin and PCB pathways without solenoid valves. All columns and tubings are disposable. Thus, cross contamination is a thing of the past.

• **Fully automated fractionation**
This instrument provides efficient concentration and fractionation using special surface-treated adsorbent in concentration columns instead of an evaporator.

Purification

GC·MS measurement

Specifications

GO-2HT   GO-4HT   GO-6HT

	Unit	GO-2HT	GO-4HT	GO-6HT
Maximum Pressure Limit of System	MPa		0.3	
Maximum Pressure Limit of Method	MPa		0.2	
Capacity	number of samples simultaneously	2	4	6
Solvent consumption	Hexane [ml] / unit		85	
	Toluene [ml] / unit		3	
Liquid Pump	Flow / ml / min		0.2~10.0	
	Withstanding Pressure / MPa		0.6	
	Accuracy / %		±2	
	Materials of head		PVDF, PTFE, FFPM	
	Chemical resistance		Hexane, Toluene	
Air Pump	L / min		Max 7.5	
	MPa		Max 1.5	
	Materials of head		EPDM, PET (GF30%)	
Heater	Hi-SD Ø10X40L / for Purification Column	x 2	x 4	x 6
	Hi-SD Ø6X30l / for Concentration Column	x 4	x 8	x 12
Control System	Controller		PLC (Programmable Logic Controller)	
			MITSUBISHI MELSEC Q	
	Screen		Pressure activated touchpad	
			MITSUBISHI GOT 1000 GT14	
Weight	Controller / kg		15	
	Block Unit / kg	40	80	120
External Dimensions*	Controller / W x D x H mm		220 x 600 x 517	
	Processing Units / W x D x H mm	410 x 530 x 820	820 x 530 x 820	1230 x 530 x 820

*Please make sure to leave an interval of at least than 1cm between the controller and each processing unit.

Compact, user and eco friendly POPs analysis

The high performance purification columns are heated which enables fast elution of DXNs and PCBs, while a chemical reaction with the sample and the chemically-modified silica gel eliminates interferences.
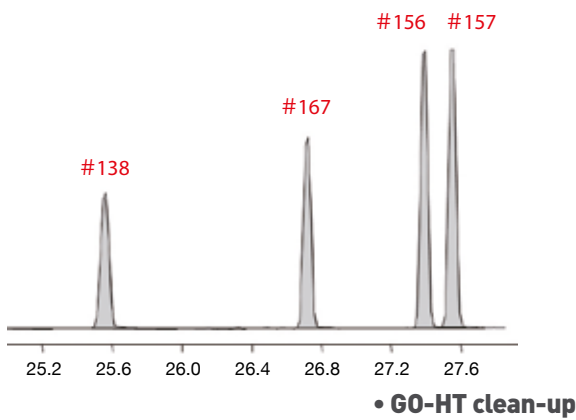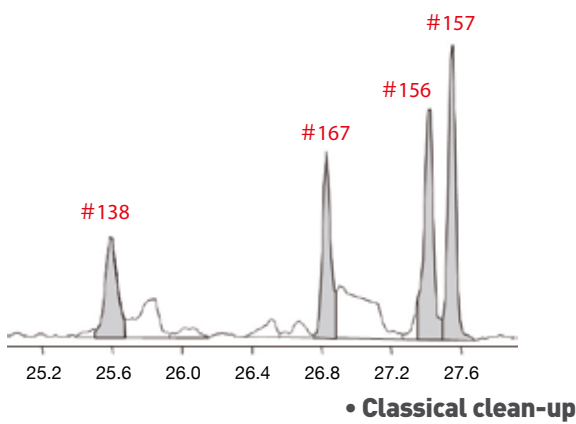
1 **Clean up with 85ml of Hexane**

2 **Elute PCBs fraction with 1.5ml of Toluene**

3 **Elute DXNs fraction with 1.5ml of Toluene**

Selectivity

Some PCB isomers in feed samples are shown below. The high performance adsorbens in the concentration column has been developed to selectively adsorb and concentrate DXNs and PCBs.

#138   #167   #156   #157

25.2 25.6 26.0 26.4 26.8 27.2 27.6

• Classical clean-up

#138   #167   #156   #157

25.2 25.6 26.0 26.4 26.8 27.2 27.6

• GO-HT clean-up

Cross contamination free and a unique way of flow switching.

DXNs fraction
17 isomers of 2, 3, 7, 8 substituted chlorinated dibenzo-p-dioxins, dibenzofurans and 4 isomers of non-ortho PCBs in about **1.5ml of Toluene**

3

PCBs fraction
6 isomers of NDL-PCBs, 8 isomers of mono-ortho PCBs in about **1.5ml of Toluene**

The effect of the heated concentration column is that the amount of toluene necessary for elution of DXNs and PCBs elution is significantly decreased.
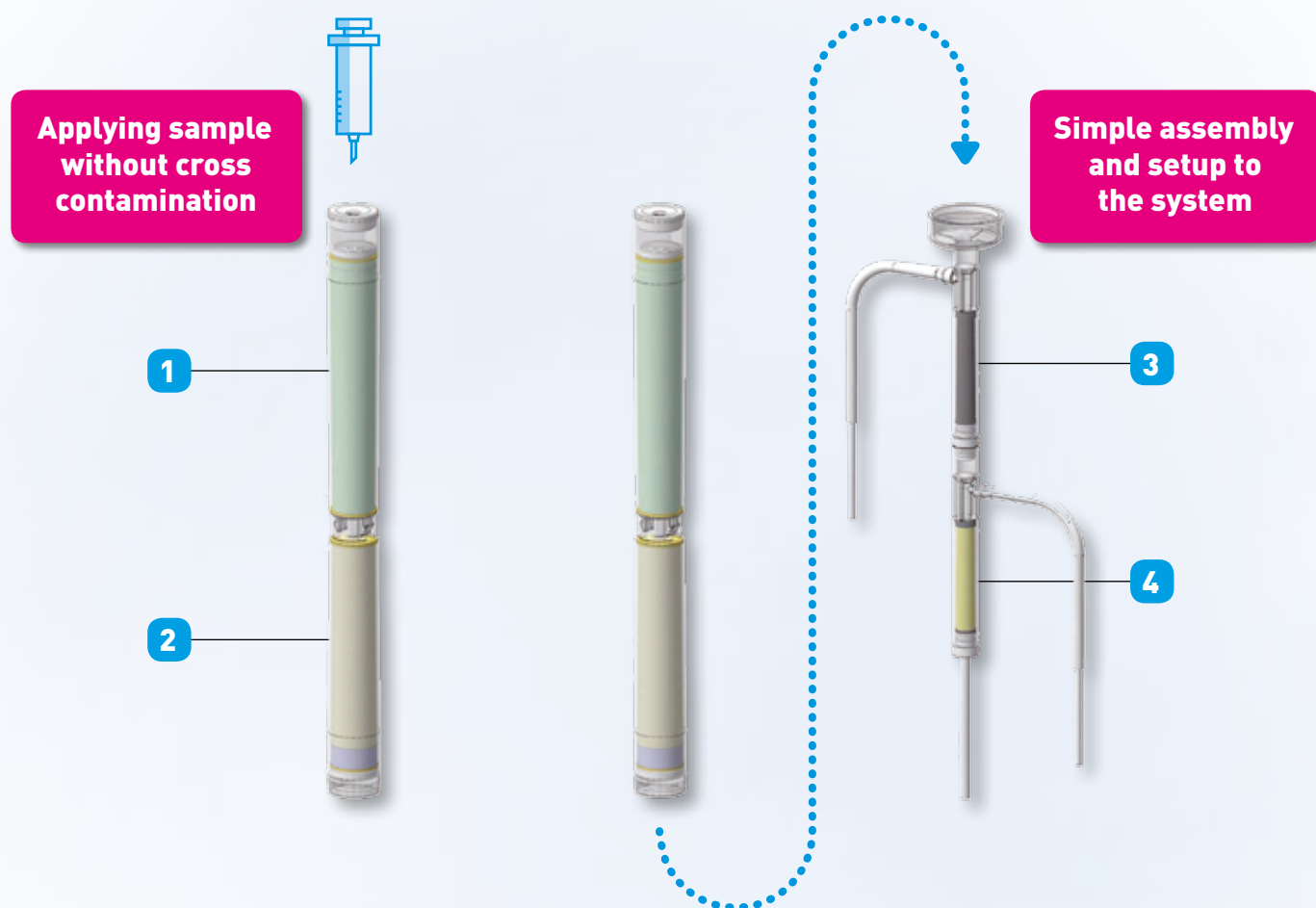
2

Waste fraction
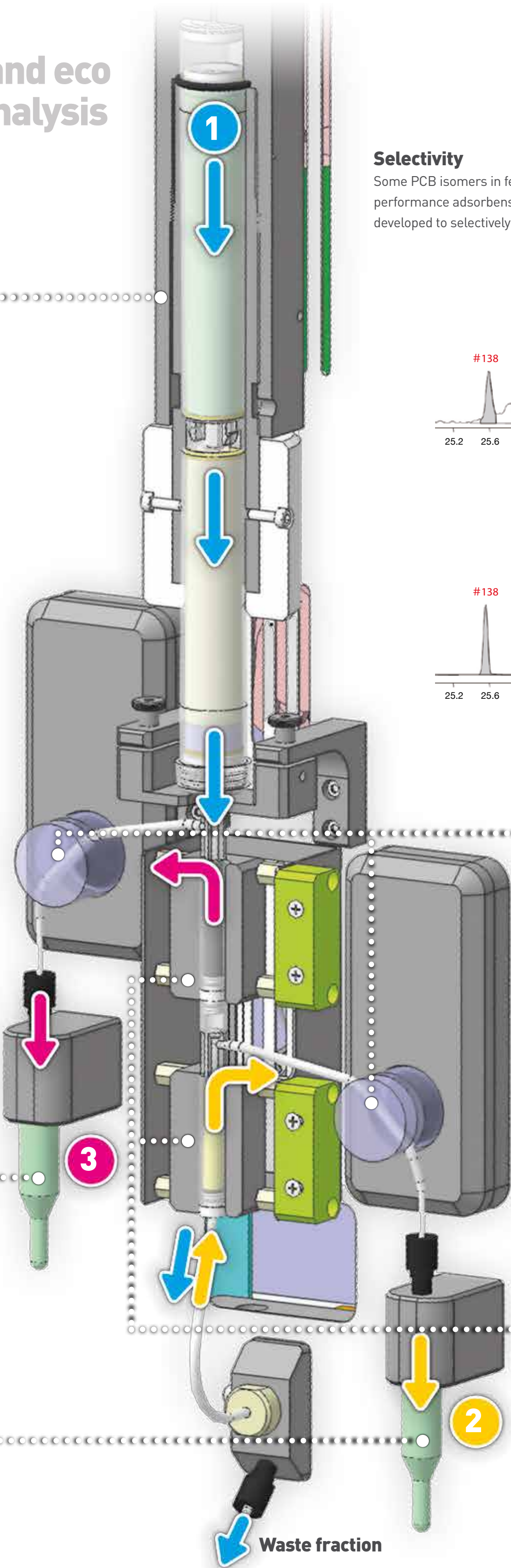
Performance

Inspire synergy

This system provides excellent performance for daily use:

• Reliable and long-lasting
• Saves time and money
• Leads to higher productivity
• Reduces organic solvent exposure
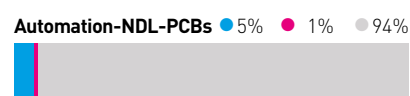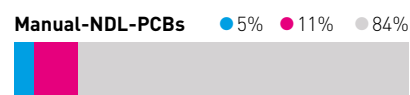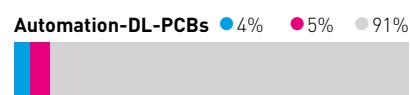• Reduces organic solvent consumption

Applying sample without cross contamination

Simple assembly and setup to the system

Ø18 column	Filler and Column Length		Ø20 column	Filler and Column Length	
	AgNO$_3$-Silica gel Length = 82.5 mm	1		**AgNO$_3$-Silica gel** Length = 117.6 mm	1
	H$_2$SO$_4$– Silica gel Length = 108 mm	2		**H$_2$SO$_4$– Silica gel** Length = 100 mm	2
	Carbon Length = 39 mm	3		**Carbon** Length = 39 mm	3
	Alumina Length = 39 mm	4		**Alumina** Length = 39 mm	4

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Validation data

The purification columns are designed to assure repeatability and reproducibility of Dioxins and PCBs in complex matrices. The recovery of Dioxins, DL-PCBs and NDL-PCBs show improvements compared with classical methods (shown in the bar chart).

[pg / g]

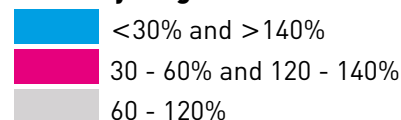| Matrix	Quantity of Fat (g)	TEQ PCDD / DFs	TEQ DL-PCBs	TEQ PCDD / DFs + DL-PCbs	Sum PCB ind
Butter	1.0	2.908	0.357	3.265	1.25
	2.0	2.83	0.392	3.221	1.32
	3.0	2.787	0.374	3.161	1.18
	4.0	2.744	0.369	3.113	1.17
	RSD	2%	4%	2%	6%
Bovine Compound Feed	0.21	1.2	0.877	2.077	1.85
	0.25	1.176	0.916	2.092	1.84
	0.26	1.209	0.979	2.188	1.84
	0.22	1.221	0.913	2.135	1.8
	0.21	1.226	0.902	2.128	1.8
	0.22	1.186	0.889	2.075	1.85
	0.24	1.194	0.949	2.142	1.75
	0.22	1.21	0.945	2.155	1.85
	RSD	1%	4%	2%	2%
Pork Fat	2.0	0.037	0.008	0.045	0.25
	3.0	0.032	0.012	0.044	0.26
	4.0	0.03	0.011	0.042	0.23
	RSD	11%	20%	3%	6%
Salmon	0.25	0.776	1.605	2.381	10.09
	0.15	0.747	1.47	2.217	9.97
	0.3	0.766	1.458	2.224	10.73
	0.46	0.744	1.499	2.243	10.35
	0.58	0.725	1.493	2.217	10.89
	RSD	3%	4%	3%	4%
Grass	0.04	0.339	0.698	1.037	5.04
	0.1	0.32	0.747	1.067	4.95
	0.17	0.334	0.752	1.087	5.01
	0.25	0.353	0.761	1.114	5.11
	RSD	4%	4%	3%	1%

Manual- PCDD / Fs ● 5% ● 17% ● 78%

Automation-PCDD / Fs ● 5% ● 13% ● 82%

Manual-DL-PCBs ● 5% ● 14% ● 82%

Automation-DL-PCBs ● 4% ● 5% ● 91%

Manual-NDL-PCBs ● 5% ● 11% ● 84%

Automation-NDL-PCBs ● 5% ● 1% ● 94%

Recovery range
■ <30% and >140%
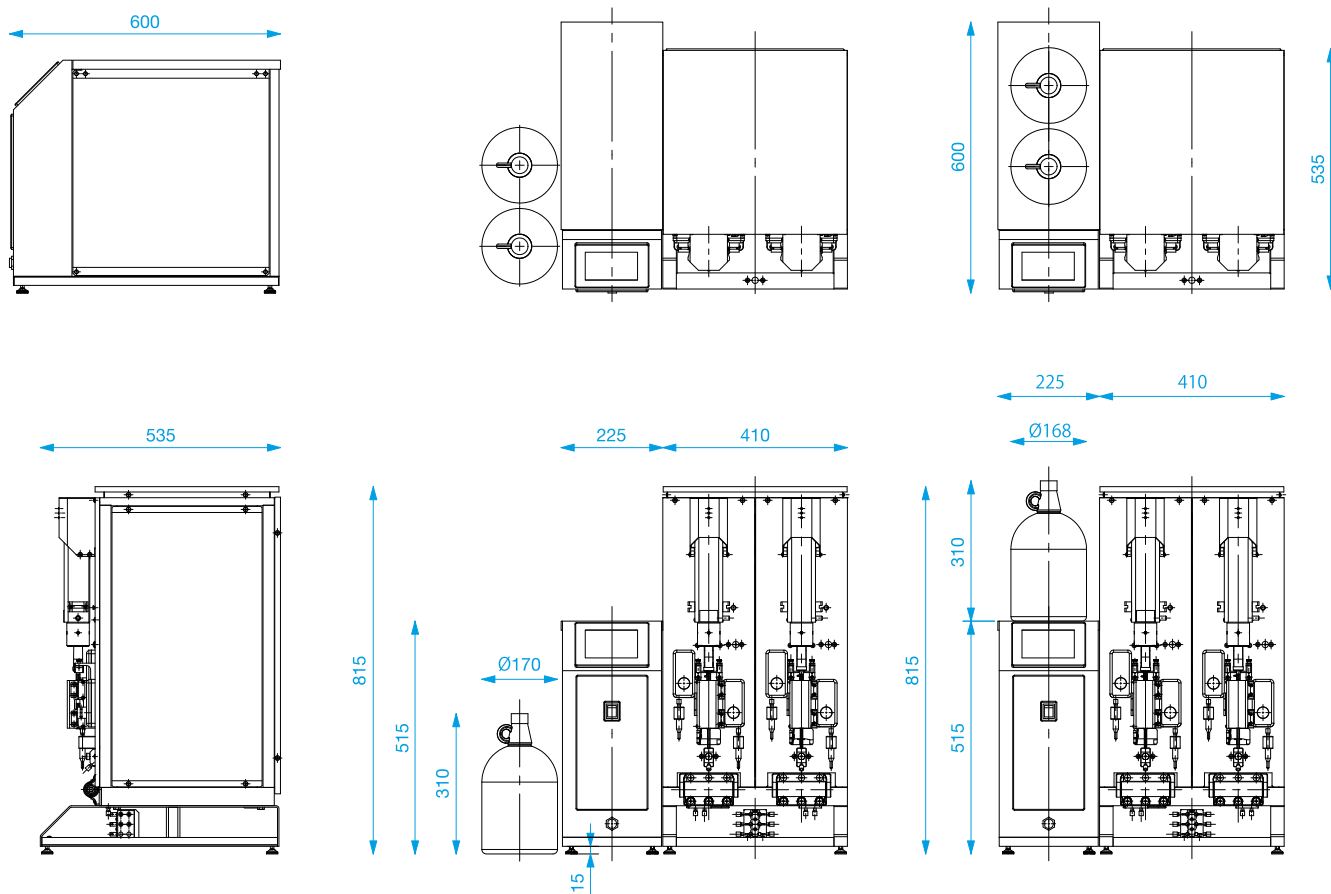■ 30 - 60% and 120 - 140%
■ 60 - 120%
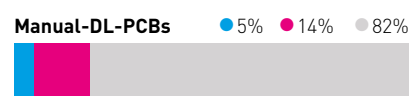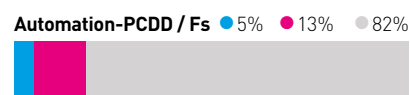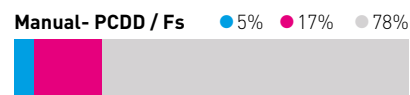
Easy and Flexible Control
- Control based on a highly reliable 'Programmable Logic Controller'.
- User-friendly 'Pressure activated touchpad'.
- No need to establish a user method.
- Previous alarm and operation histories are available.

External dimensions

Product upgrades may be made without notice.

Please address any enquiries concerning this brochure to mail@dspsystems.eu.

Safety Precautions: in order to use the product safely, please read the Instruction Manual first