IFC PAL

A new perspective in sample purification

Sample Purification

Medicinal Chemistry

CombiChem

Compound Isolation

Autopurification

Drug Discovery

- Sample injection and fraction collection on one single instrument
  Dual arm concept prevents cross contamination
- Collects in up to 1000 test tubes in semiprep mode
  or 24 microplates in analytical applications
- Unique sideport syringe acts as diverter valve
  Variable tray layouts allow quick process adaption
- Optimized time management, next injection
  prepared during sample collection
- Single software solution for injection and collection
  FractPAL software plug-in for Agilent ChemStation

The IFC PAL platform

IFC PAL Semiprep Version equipped with test tubes

IFC PAL Analytical Version equipped with microplate stacks

With the raising interest in the discovery of new compounds that may develop into safe and effective drugs, there is a growing need for efficient separation, isolation and purification of small or large quantities of compounds. Quick purification represents an essential step between synthesis, screening and characterization of new potential pharmaceutical candidates.

CTC Analytics supplies instruments to customers which make the operation of sample processing simple and transparent. The IFC autopurification platform was developed based on the proven reliability and productivity of our PAL series of LC/LC-MS sample loaders. The IFC PAL combines sample injection and fraction collection with unmatched capacity and versatility. The dual-probe design allows the complete separation of injection and collection flow paths. High concentrated samples can never cross-contaminate low concentrated fractions. Additionally the commonly used 3-way fraction collector diverter valve is replaced by a unique sidehole syringe valve which enables an extremely low dead volume between valve and collection outlet. This special diverter valve design further prevents fraction carryover.

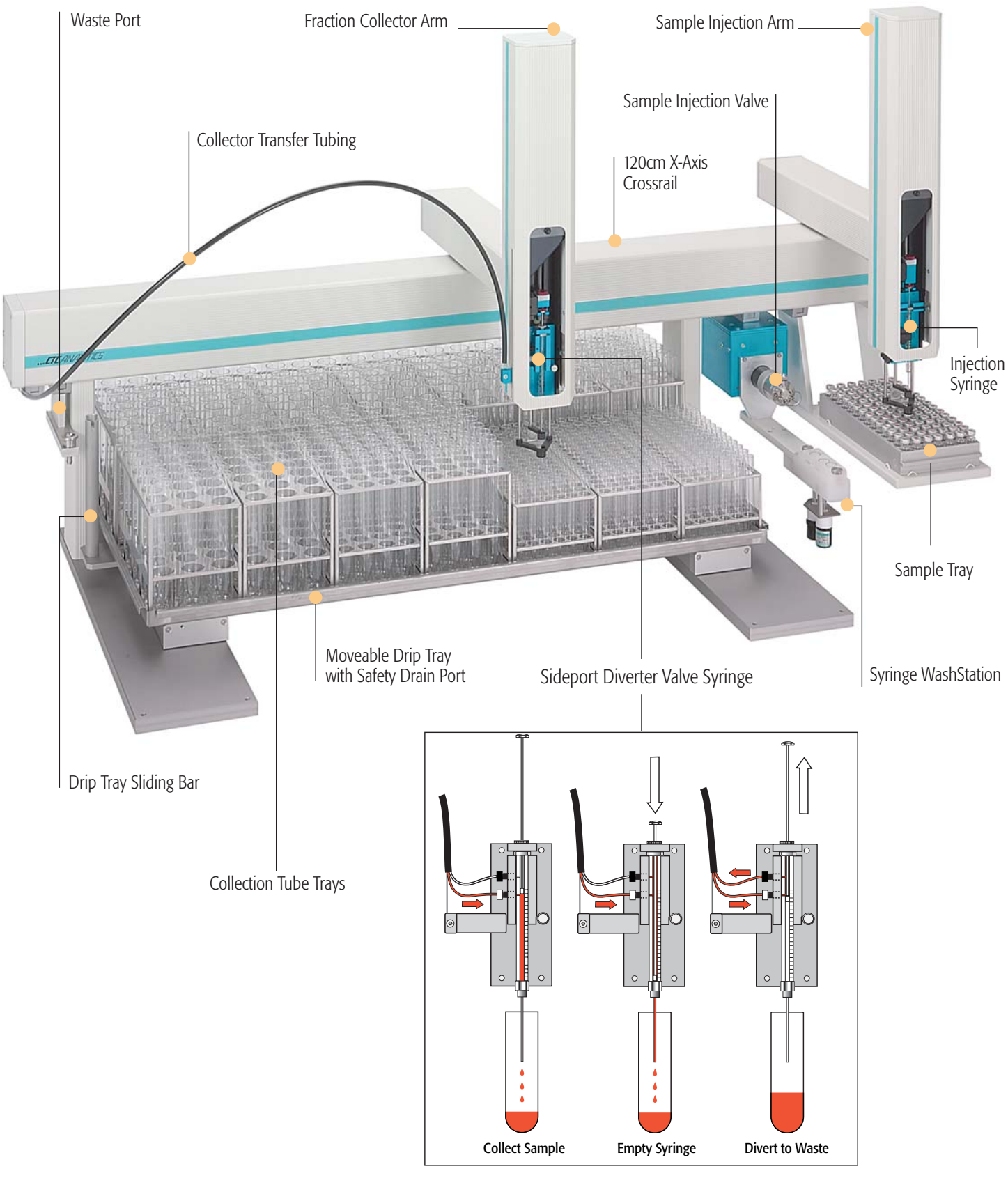
The IFC PAL dual-probe design provides true high throughput processing never achieved before by conventional autopurification solutions. During fraction collection the next sample injection is already prepared and executed. Overlapping the two processes results in dramatically faster cycle times compared to single-probe systems.

High throughput purification demands real high sample and fraction capacity. It makes little sense to use highly automated purification systems with a limited sample capacity. Starting with crude samples, the IFC PAL fraction bed accommodates up to 1092 pcs. test tubes in semipreparative mode and 24 microplates or 1296 pcs. 2ml vials in analytical mode.

The IFC PAL is available in two different system configurations. The analytical version consists of up to 5 sample stacks each holding 324 2ml vials or 6 deepwell plates / standard plates (96 or 384 wells). The semi-preparative version includes one sample trayholder and 14 test tube trays in a wide variety of tube sizes. Both systems contain carefully adapted hardware components to meet the specific needs of the two different applications.

Both systems are delivered with the IFC PAL software package dedicated for the fraction collection process. Each single step from injection to fractionation can be controlled in a easy and straightforward way.

The IFC PAL overview



The IFC PAL Specifications

Sideport Diverter Syringe

The IFC PAL accommodates up to 6 Gilson 215 Trays

IFC PAL equipped with both analytical and prep valves

IFC PAL high resolution Analog/Digital Converter

Injection Syringe sizes (Injection side):

Analytical: 10µl / 25µl / 100µl / 250µl / 500µl
Semiprep: 250µl / 500µl / 1ml / 2.5ml / 5ml

Sideport Diverter Syringe sizes (Collection side):

Analytical: 4µl / 20µl / 80µl
Semiprep: 80µl / 800µl (flow rate max. 50ml /min)
Needle electrically grounded against static charge

Syringe needle specifications:

Analytical needle gauge: 22S / 22
Semiprep needle gauge: 19
Needle pointstyle: 3

Transfer Tubing:

Analytical: FEP OD 1/16 inch, ID 0.8mm
Semiprep: FEP OD 1/16 inch, ID 1.0mm (flow rate max. 50ml /min)

Analytical Sample capacity:

Injection side:	1296	2ml vials
	200	1ml vials
	24	deepwell plates (96 or 384 wells)
	24	standard plates (96 or 384 wells)
Collection side:	1296	2ml vials
	24	deepwell plates (96 or 384 wells)
	24	standard plates (96 or 384 wells)

Semiprep Sample capacity:

Injection side:	98	2ml vials
	32	10 / 20ml vials
Collection side:	1092	Test Tubes 13x100mm (9ml)
	700	Test Tubes 16x100mm (12ml)
	700	Test Tubes 16x150mm (20ml)
	504	Test Tubes 18x150mm (27ml)
	504	Test Tubes 20x150mm (34ml)
	294	Test Tubes 25x150mm (55ml)
		optional Drip Tray for 6 Gilson 215 Racks

Syringe cleaning:

Fast WashStation for 2 different solvents (2x 1 liter solvent reservoirs)

Injection Valves:

VICI Valco 6-port Injection Valves Cheminert style
0.25mm bore size for flow rate 10 - 500µl/min
0.4mm bore size for flow rate 0.5 - 20ml/min
0.75mm bore size for flow rate 5 - 50ml/min (semiprep only)

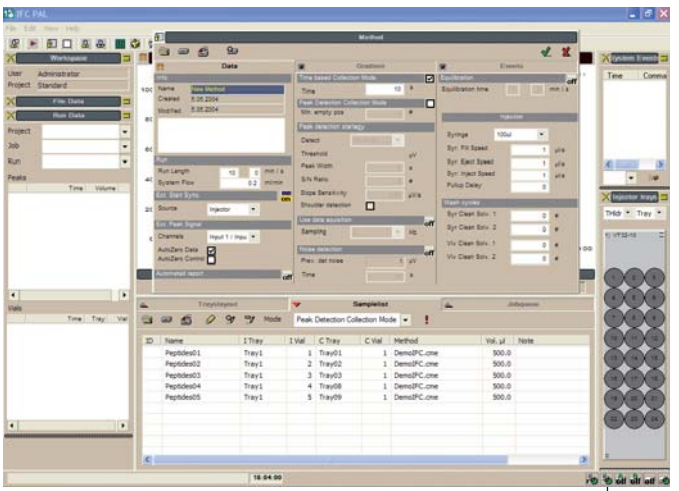
Sample Loop Sizes:

Analytical: 20µl / 50µl / 100µl / 250µl / 500µl
Semiprep: 1ml / 2ml / 5ml / 10ml

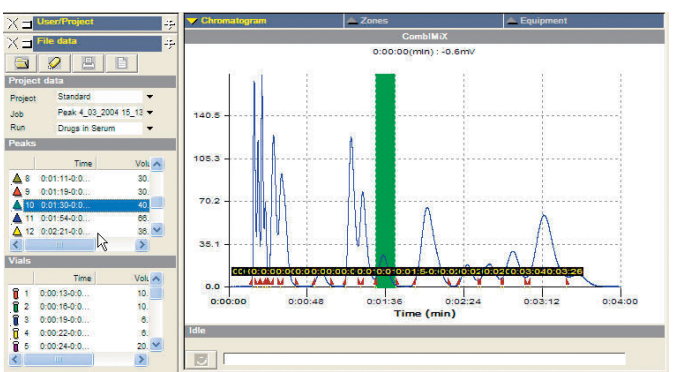
Analog/Digital Converter:

2 A/D converters for 2 detectors, 24bit resolution, ±1V / 2.5V / 10V FS
2 Relay Outputs
4 RS 232 ports (2 used for IFC PAL control)

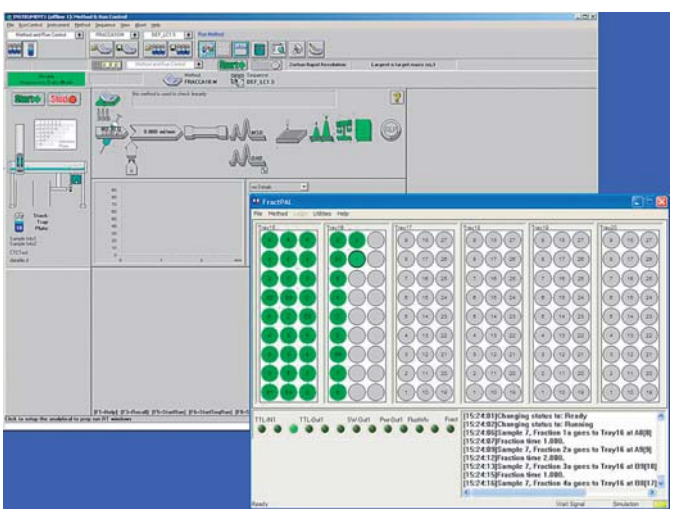
The IFC PAL software control



Dedicated IFC PAL software controls the purification process



IFC PAL software color coded sample tracking functionality



FractPAL software to control the IFC PAL inside Agilent ChemStation

The IFC PAL software package is specificly designed to control each single step of the purification process. It allows to control LC pumps and detectors, to collect fractions in manual mode or in a choice of three programmable modes:

- **Time based mode** using individual time slices per sample
- **Peak-based mode** using an analog signal e.g. UV- or ELSD detector
- **Mass-triggered mode** using an output signal of the MS for mass fractionation

The powerful easy-to-use IFC PAL software lets you build sampling sequences by selecting samples from a study layout screen. Color coded sample and fraction tracking lets you review and report an enormous amount of analytical data. It shows how many fractions have been collected and where they are located. After clicking on a position on the sample tray the software shows corresponding fractions and chromatograms.

Advanced software algorithms allow to collect the fractions correctly even for challenging peak shapes. The software recognizes peak shoulders and unresolved peaks. Moreover fractions may be reanalyzed on completion of a study without having to move plates or test tubes.

The IFC PAL software incorporates an open access interface that lets you walk up and log in your samples anytime. First simply log into the software using your ID followed by the format of the samples. Choose the method you want to use from a set of method options. After the collection process, review your results and retrieve the purified samples.

The IFC PAL software contains complete system administration tools for secure access management. All activities are stored in logfiles to ensure anytime system security.

- **ChemStation integration** using Agilent 1100 HPLC hardware including Agilent LC-MSD
- **Pre-analytical run** for determination of optimal chromatographic prep conditions
- **Mass-directed Fractionation** using the Agilent LC-MSD

A second option to control the IFC PAL represents the FractPAL software package. The optional FractPAL software allows to control the IFC PAL within the Agilent ChemStation. Seamless integration with Agilent 1100 HPLC hardware and LC-MSD components ensure single keyboard control over the whole purification system. The pre-analytical run is a preliminary sample run on the analytical column to determine the optimal conditions before a preperative run is started. It can be automatically carried out before every prep run if required. As with the original IFC PAL software, there is also an optional confirmation step (fraction re-analysis) after the collection process.

IFC PAL

General IFC PAL Specifications:

System type:
Dual-arm XYZ robot with syringe only concept
Local user interface:
Control panel with 4 function keys, graphical LCD display, unique scroll knob for teach functions

Remote control:
IFC PAL control software Windows 2000/XP
FractPAL control software Windows 2000/XP

Electrical control:
4 RS232C ports,
6 TTL Input/3 TTL Output,
3 Opto Coupler Input,
4 Relay Output

Dimensions:
L: 1428mm (36.2 in) D: 912mm (23.1 in) H: 670mm (17.0 in)

Weight:
39kg (88lbs) main unit including empty test tubes

Operating Temperature:
4° to 40°C (39° to 104°F)

Maximum Relative Humidity:
75%, non-condensing

Vibration:
Negligible

Power requirements:
Input Voltage 100-240V, 120W, 50/60Hz

Bench Space:
Additional 16cm (6 in) at the rear, space for fluid waste containers below the instrument.
Access to power switches and power cords.
Clean, level and smooth surface, solid bench plate.
Operation in ventilated area only (fume hood recommended)

Specifications are subject to change without notice

Other CTC Front-End Automation Products

High Troughput Sample Injectors for LC / LC-MS Applications

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...CTC ANALYTICS
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CTC Analytics AG
Industriestrasse 20
CH-4222 Zwingen
Switzerland
Tel: +41 61 7658100
Fax: +41 61 7658199
E-mail: info@ctc.ch