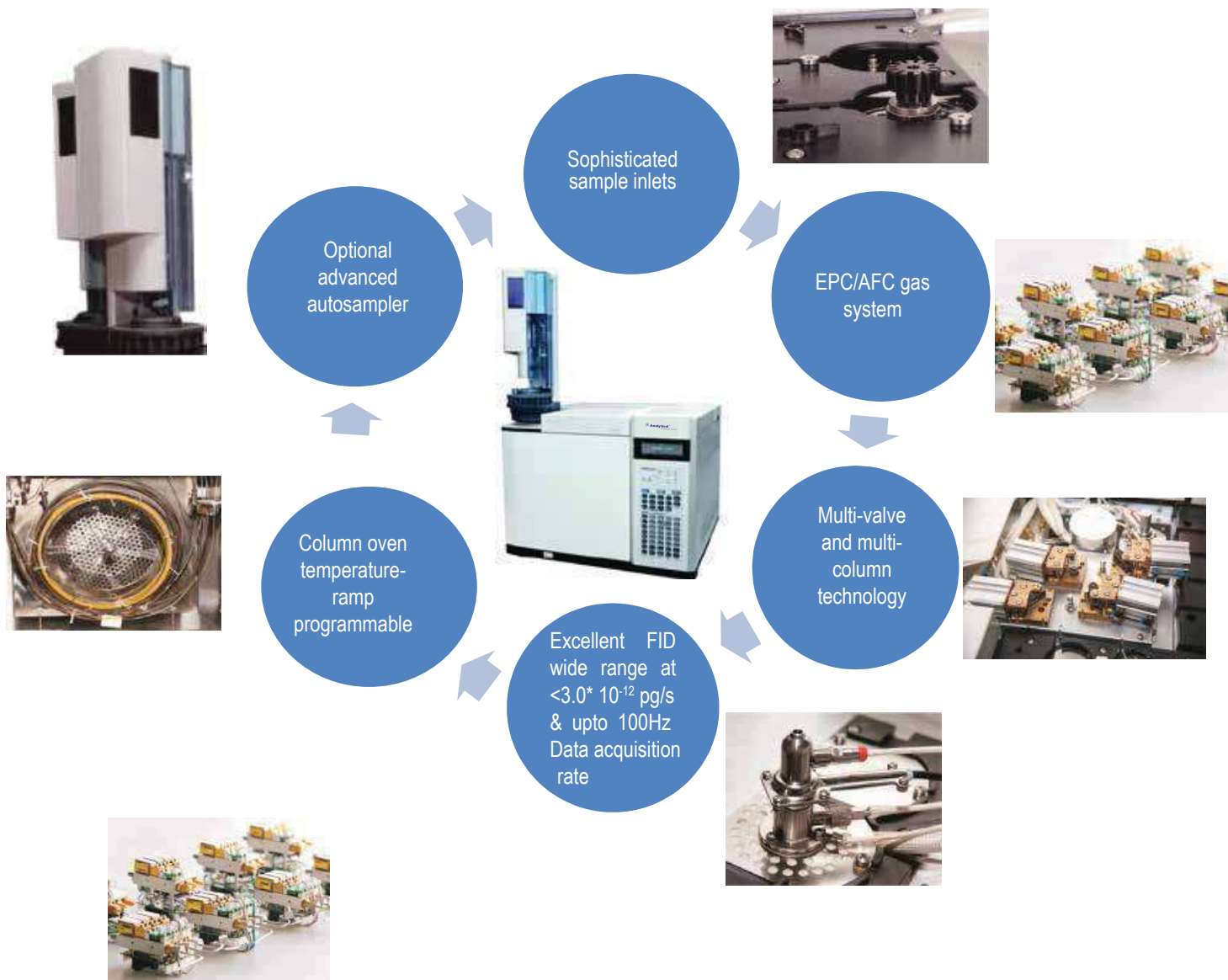


# Gas Chromatography Optima GC - 3007



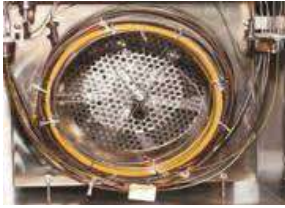
Carrier and makeup gas settings selectable for He, H<sub>2</sub>, N<sub>2</sub> and Ar

Psi, KPa, Bar units selectable

Pressure control range: 1~150psi, Pressure accuracy: 0.001Psi  
Programmable pressure ramp RSD  $\leq$  0.5%

Flow rate control range: 0~600ml/min, flow rate accuracy: 0.1ml/min  
flow rate RSD  $\leq$  0.1%

programmable pressure/flow rate ramping: 20 steps



**Column oven dimension: 278x 310x 165mm=14.2L**

Temp. Contrl range: RT+5°C ~ 450°C (0.1°C increment)

Programming temp. - ramp speed : 0-120°C/min

Programming ramp : 20 ramp

Fast cool down: 450~50°C ≤ 1.5minutes

Temp. accuracy: ±0.1°C

Detector	Max operating temp.	Limit of detection	Baseline noise	Temperature Increment Resolution	Baseline drift (after 2hrs stabilization)	Linear dynamic range
FID	450°C	1.5PgC/s (N-C16)	≤2 x 10 <sup>-14</sup> A/min	1°C	5 x 10 <sup>-14</sup> A/30min	≥ 10 <sup>7</sup>
TCD	400°C	≥ 10000mV.ml/mg (N-C16)	≤30uV	1°C	≤ 100V /30min	≥ 10 <sup>5</sup>
ECD	400°C	≤ 10 x 10 <sup>-14</sup> g/ml (Y-666)	≤20uV	1°C	≤ 50uV /30min	≥ 10 <sup>4</sup>
FPD	400°C	S: ≤2.0 x 10 <sup>-11</sup> g/s P: ≤5.0 x 10 <sup>-13</sup> g/s or 2.0 x 10 <sup>13</sup> g/s	S: ≤2 x 10 <sup>-13</sup> A P: ≤8 x 10 <sup>-13</sup> A	1°C	S: ≤1 x 10 <sup>-12</sup> A/30min P: ≤2 x 10 <sup>-12</sup> A/30min	S ≥ 10 <sup>2</sup> P: ≥ 10 <sup>3</sup>
NPD	400°C	N: ≤0.3 x 10 <sup>-12</sup> g/s(Azobenzene) P: ≤0.1 x 10 <sup>-13</sup> g/s(Malathion)	≤4 x 10 <sup>-13</sup> A	1°C	2 x 10 <sup>-12</sup> A/30min	N: ≥ 10 <sup>3</sup> P: ≥ 10 <sup>3</sup>

Standard setup	Capillary inlet	Split/splitless capillary
	Packed inlet	Packed inlet
	Workstation	Optima-3007 Clarity counter-control workstation
Optional sampling device	Injection Valve	6 - port valve or 10-port valve
	Headspace sampler	Available
	Thermal desorption	Available
	Auto sampler	16 or 150

## Clarity workstation feature

Multi-channel and multi-user universal workstation to control all parameter Can collect signal from 4 detectors via RS232 or USB

Basic parameter: max sample-collecting frequency @100Hz/unlimited peak process quantity/integral sensitivity @1 $\mu$ V\*s

Batch processing makes machine control, auto sampling sequence collecting, auto integral correction much easier auto integral correction much easier

Fully support FDA-21CFR PART 11, SST AND IQ/OQ

Powerful post-treatment facilitate chromatography comparing, re-correction and data input&output.

Feature like easy to use report publisher, online help and answer, fully compatible with windows 7/10.

Offers minimum sampling time snapshot function, single analysis capability. Automatic and manual peak integration, manipulation, identification, calibration points and levels and manual calibration curve creation, column performance calibration, data comparison function etc.



## Instrument feature

- One button access to routine maintenance information.
- PCM control module much precise with independent-development AFC system;
- 8-channel high-accuracy temperature control system and 8-channel outside events to fulfill counter-control ;
- Every gas circuit can achieve constant-pressure, constant-flow, constant-speed, programmable-temperature-rise, programmable-flow-rise and programmable-speed-rise;
- Unlimited valve events to fulfill accurate switching of multi-valve;
- Outside power & voltage checking system, over-heating protection system and flow monitoring system to make it intellectualized.
- Vacuum fluorescent display with english/chinese changeable;
- Multi-function keyboard can set complicated parameters and store 16 chromatography method;
- FID and FPD can provide reminder for auto ignite and turn-off, TCD with overflow/cut-off protection, flameout detection.
- Excellent FID wide-range to enhance linear range;
- Multi-valve and multi-column switch system to make sure complicated analysis at one times injection;
- PCB system shielding function to reduce interference;
- Carrier gas saving mode available to reduce cost;
- Autosampler, headspace and thermal desorption can be incorporated;
- Clarity workstation can fulfill 3Q certification to meet GMP/GLP standard.
- GC should be capable of upgradation to any 3rd detector or mass Detector.
- Built in display and computer interface, display chromatograms, method parameters like temp., pressure and flow rates etc.
- ECD complete with 63Ni source and low voltage heaters

## AFC characteristic

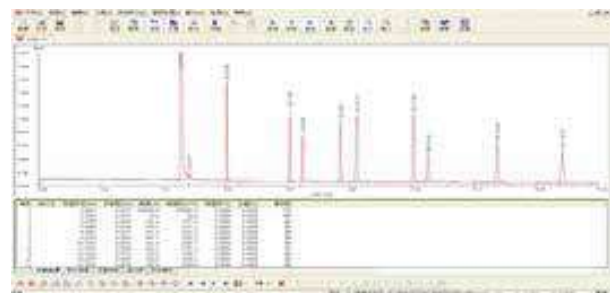
AFC: split/splitless mode, carrier gas can fulfill constant-pressure, constant-flow, constant-speed, programmable-temperature-rise, programmable-flow-rise and programmable-speed-rise to reduce sample decomposition and discrimination while increase separation and shorten analysis time.

EPCAFC fulfill digitalization and automatization, only need input column parameters, EPC/AFC can set best flow of column and show digitally.

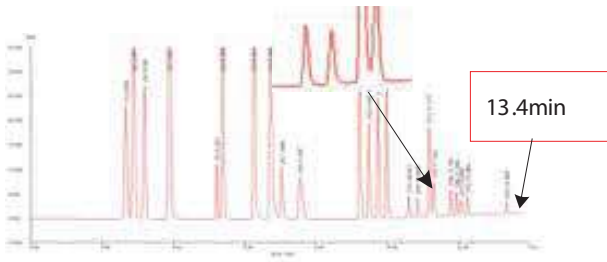
EPC/AFC can fulfill gas leaking self-diagnosis and cut off flow&gas source and alarm at the same time.



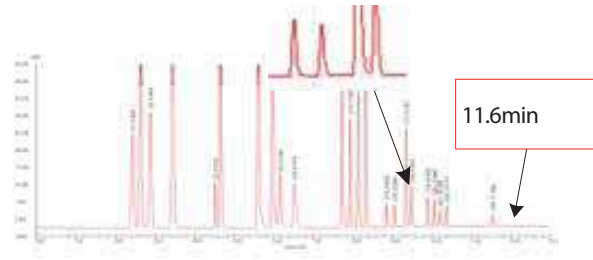
Traditional GC(Column temp @140°C) Analysis time 43min



GC9720(Column temp @140°C) with programmable pressure-rise Analysis time 17min

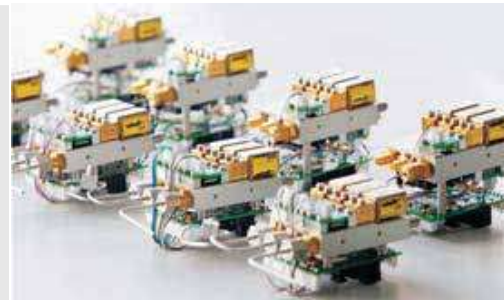


Traditional GC constant-flow mode Analysis time 13.4min



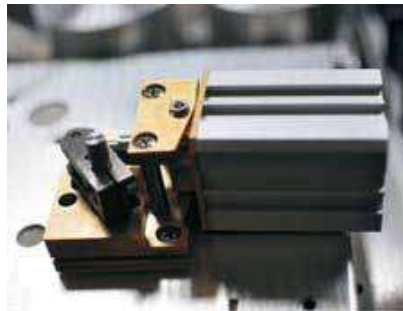
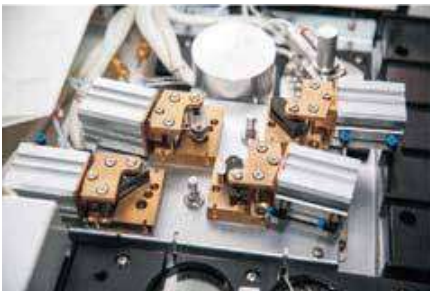
Optima-3007 with programmable pressure-rise Analysis time 11.6min

Carrier gas saving mode:  
After injection, can proceed low split flow mode automatically to reduce carrier gas significantly.

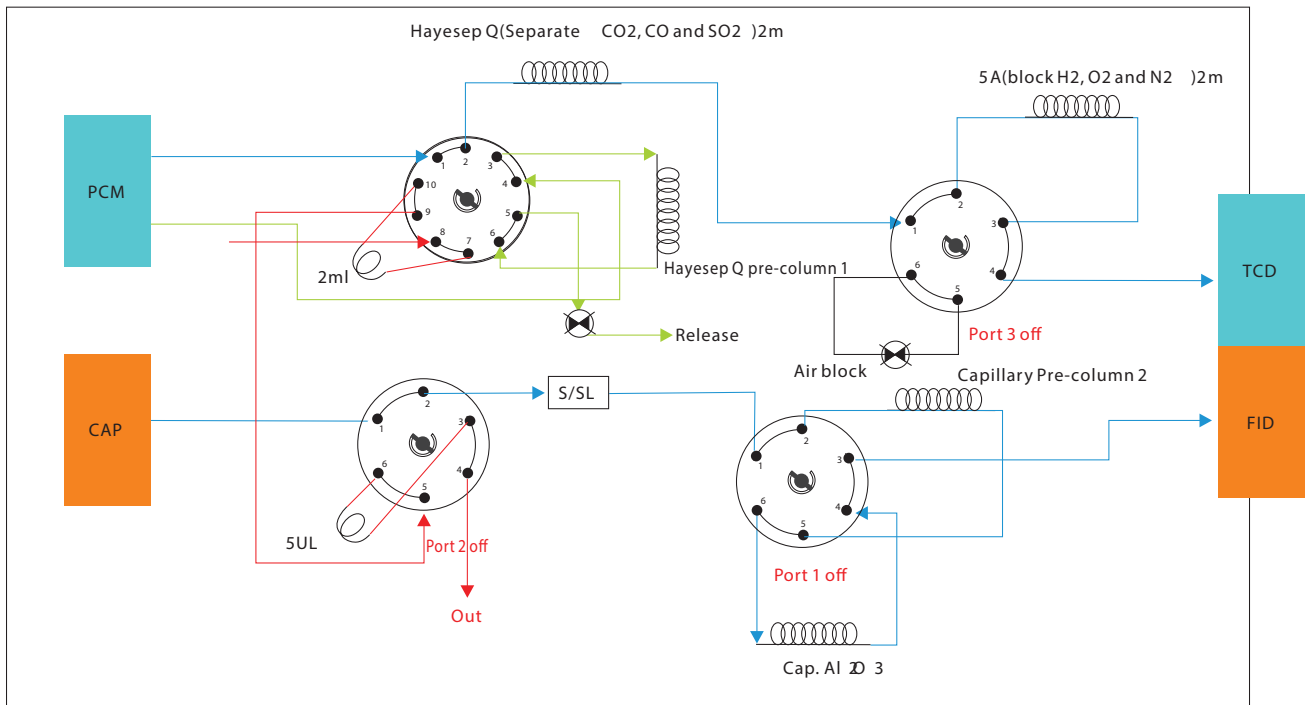


## Multi-valve and multi-column switch

Adopting AFP pneumatic valve, can setup 3-valve- 4-column and 4-valve- 5- column switch system to fully analyze only at one time sinpetro chemical, coalgas, trace C<sub>2</sub>H<sub>2</sub> inethylene and trace CO and CO<sub>2</sub> in ethylene.



## Multi-valve and multi-column flow diagram



## Clarity workstation is applicable

- ▶ Multi-channel and multi-user universal workstation to control all parameter
- ▶ Can collect signal from 4 detectors via RS232 or USB
- ▶ Basic parameter: max sample-collecting frequency @100Hz/unlimited peak process quantity/integral sensitivity @1\* $\mu$ V
- ▶ Batch processing makes machine control, auto sampling sequence collecting, auto integral correction much easier
- ▶ Fully support FDA-21CFR PART11, S STAND IQ/OQ
- ▶ Powerful post-treatment facilitate chromatography comparing, re-correction and data input&output.
- Fully counter-control to set all parameter in workstation
- Easy operational
- Multi-channel signal sampling, multi outside events control



FL9720 workstation feature



## Autosampler for optima-3007

Big displayer with double-tower automatic injection;

Tray vial quantity: 16 or 150;

Injection volume: 0.1-250uL;

Sampling accuracy: +0.01uL;

Precision: 0.4%

Injection Port: split/splitless capillary

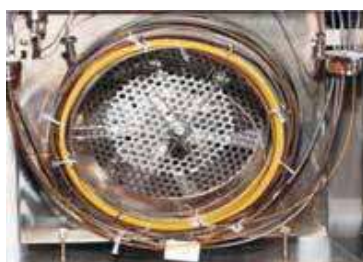
Injection needle: 5, 10, 50, 100uL;

Injection loop: multiport(0.25ml, 0.5ml and

1ml) Injection repeatability: <0.5%

Maximum Temperature: 450°C

Maximum pressure: 0-150psi(with EPC)



Column oven dimension: 278x310x165mm=14.2L;

Temp. control range: RT+5 ~450 (0.1 increment);

Temperature Ramp: multi-ramp(>14)with plateaus

Temperature set point Resolution: 1

Programming temp.-ramp speed: 0-120°C/min

Programming temp.-ramp : 20

Fast cool down: 450~50°C≤ 5min

Temp. accuracy: 0.1°C.



Wide split ratio setting range;

Max capillary split ratio: 7500:1

Packed injection, capillary injection, flash-evaporation

injection, PTV injection and liquid injection are available;

Easy consumables changeover .



Excellent wide range FID design, no ceiling limit for solvent peak;

Limit of detection can be  $3 \times 10^{-12}$ g/s;

Ignition recognition, Hprotection, anti-ponding;

Solvent no tailing peak.

## Can incorporate flash-evaporation and high pressure liquid injection

Flash-evaporation injection for gas-liquid mixture, high pressure valve injection for liquid.

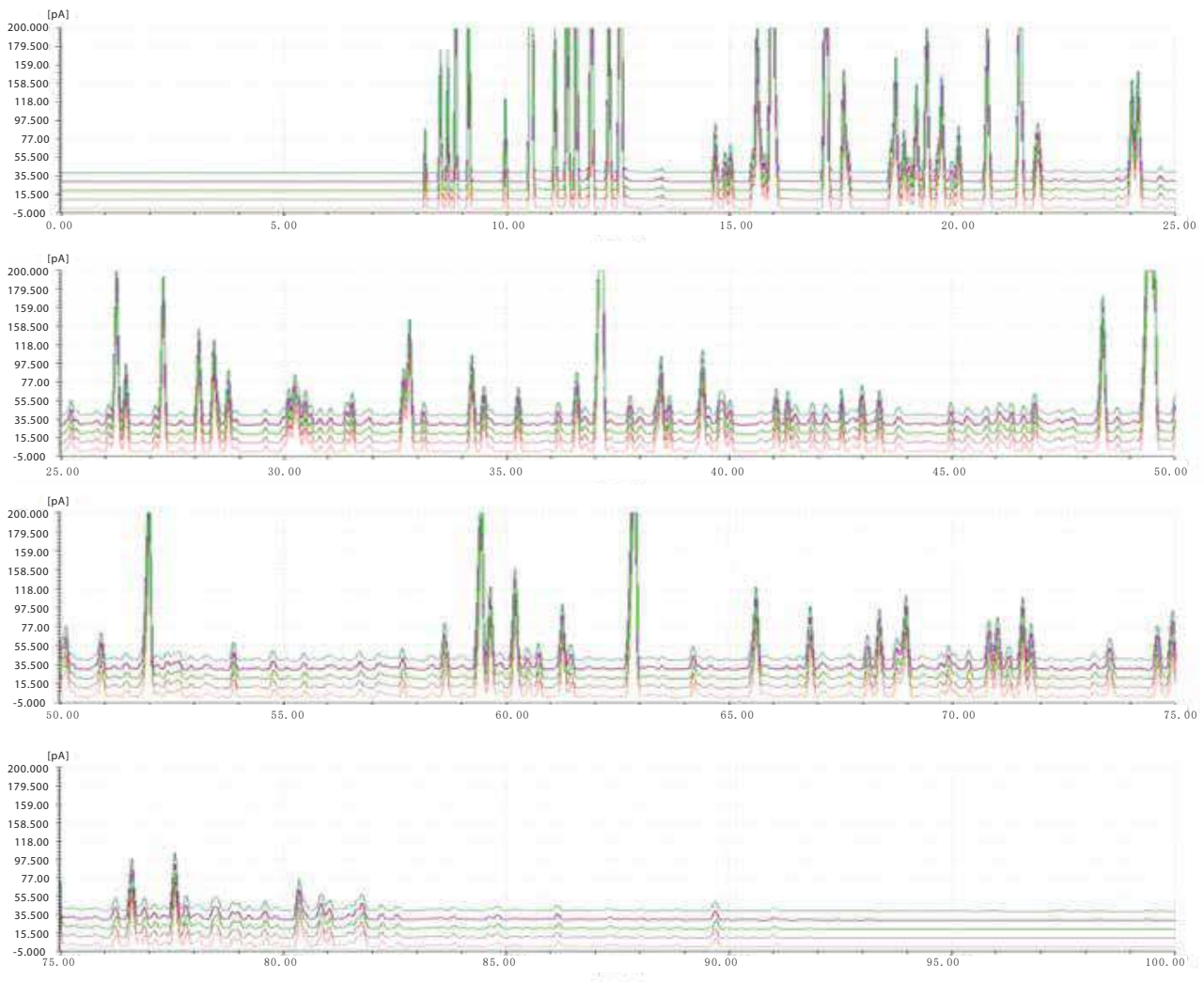
## PTV sample injection

With multiple accumulated injection and solvent release, increase temperature program-rise to achieve trace analysis.

# Performance introduction INSTRUMENTS PERFORMANCE IS INTRODUCED

## Excellent qualitative repeatability

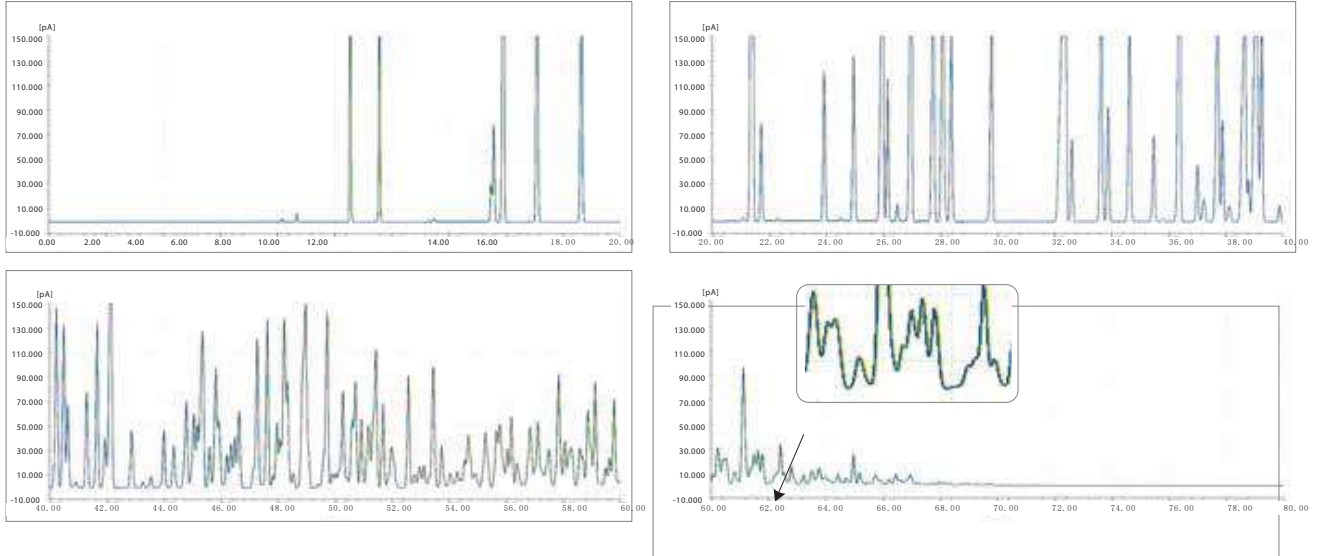
Retention time RSD  $\leq 0.05\%$





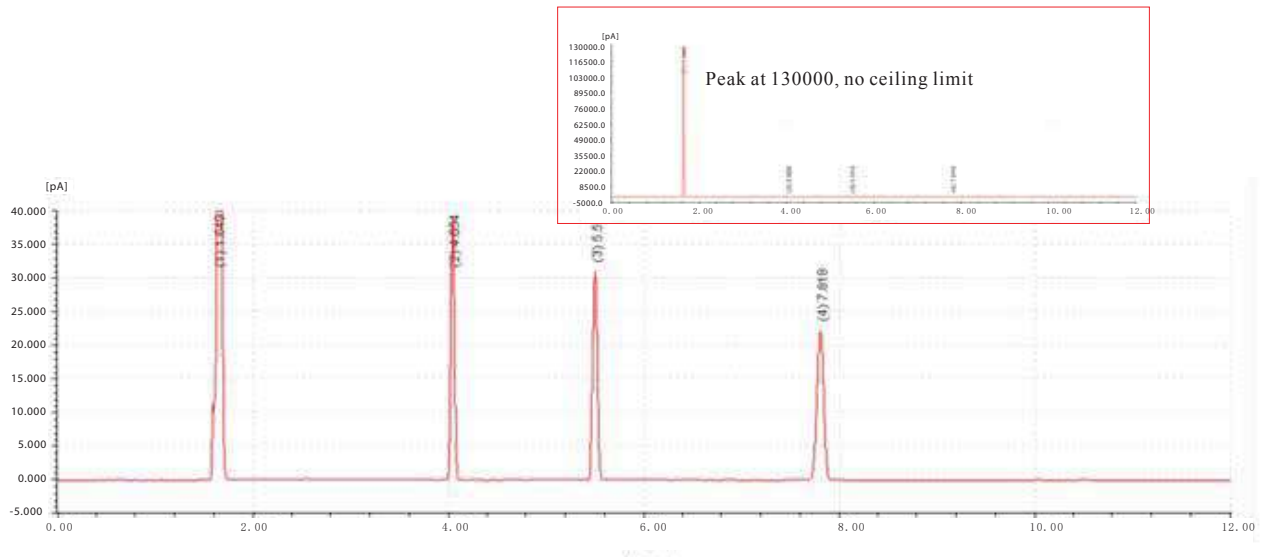
## Excellent quantitative repeatability

Peak area RSD  $\leq 0.8\%$



## Excellent wide-range design makes no ceiling limit of solvent peak

300ppm FID standard sample



## Typical application

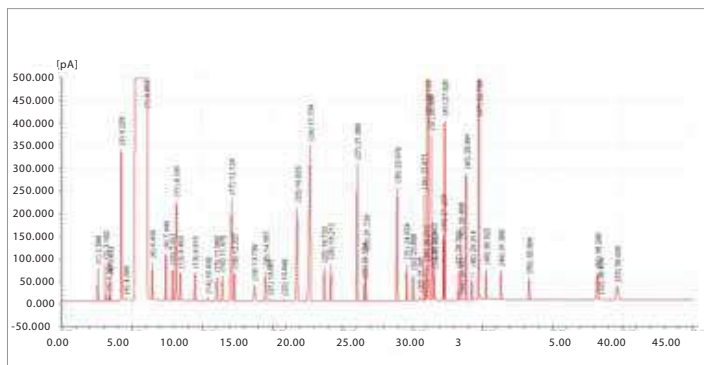
GC-3007 is suitable but not limited to below application: food safety, environmental protection, energy(), medicine Petroleum refining industry and etc.

## 【Food safety】

### Chinse white wine

#### Setup

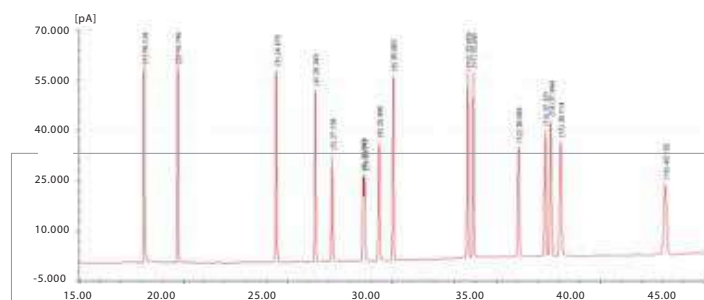
Detector: FID  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: LZP950 for wine  
Workstation: Optima-3007



### DEHP(Di-(2-ethylhexyl)phthalate)

#### Setup

Detector: FID  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: HP-5 cap.  
Workstation: Optima-3007

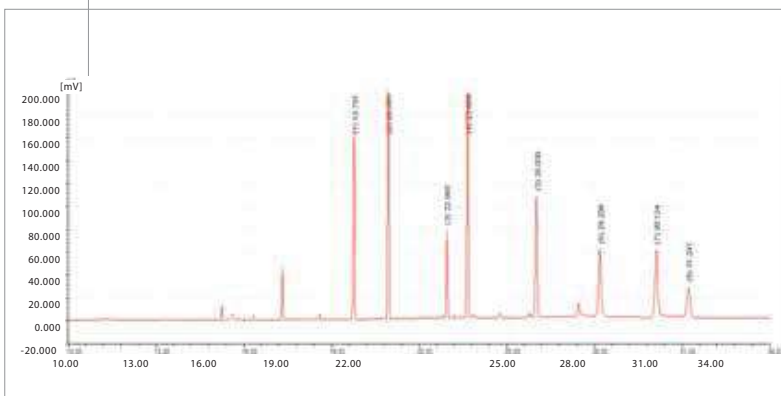


### 200ppb organochlorine in pesticide residue

#### Setup

Detector: ECD  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: HP-5  
Workstation: Optima-3007

Peak sequence:  $\alpha$ -BHC,  $\beta$ -BHC,  $\gamma$ -BHC,  
 $\delta$ -BHC, op-DDE, pp-DDD, op-DDT, pp-DDT

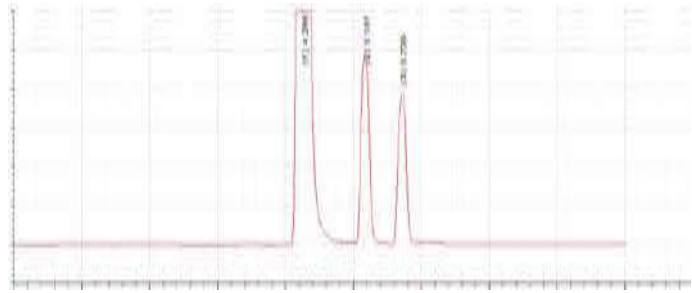




Setup

Detector: ECD  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: DM-1  
Workstation: Optima-3007

Peak sequence: CHCl<sub>3</sub>, CCl<sub>4</sub>



**【 Energy 】**

Petroleum refining

Setup

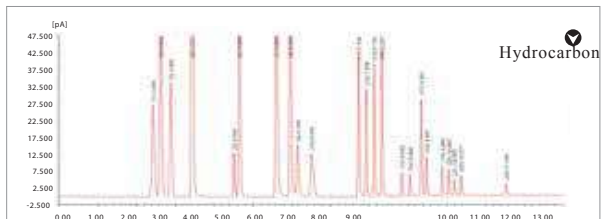
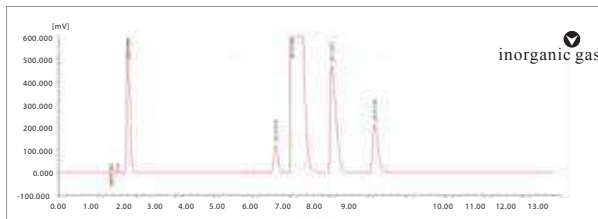
Detector: FID+TOC  
Injector: gas/capillary

4-valve-5-column  
Gas control module: 4sets  
Valve injection

Column: Hayesep Q packed, 5A packed,  
AL<sub>2</sub>O<sub>3</sub> capillary, DB-1 capillary  
Workstation: GC-3007

Inorganic gas peak sequence: H<sub>2</sub>, CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>, CO

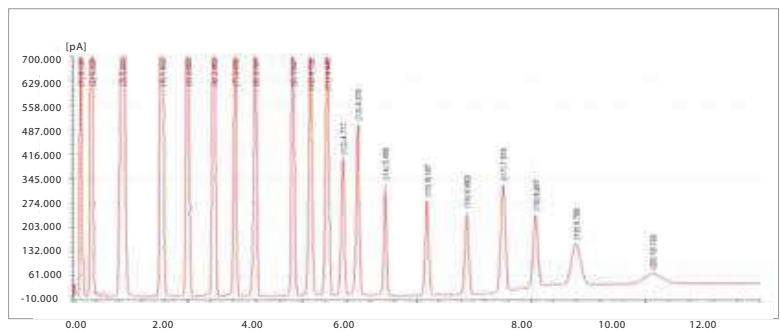
Hydrocarbon peak sequence: CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>3</sub>H<sub>6</sub>, C<sub>3</sub>H<sub>8</sub>, cyclopropane, C<sub>2</sub>H<sub>2</sub>, iso-butane, Propadiene, n-butane, trans-2-Butene, n-butylene, isobutene, cis-2-Butene, isopentane, n-pentane, allylene, 1,3-butadiene, 2-methyl-2-butene, trans-2-Pentene, 1-pentene, cis-2-Pentene, Hexane



**Distillationsimulation**

Setup

Detector: FID  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: HP-1 cap.  
Workstation: GC-3007

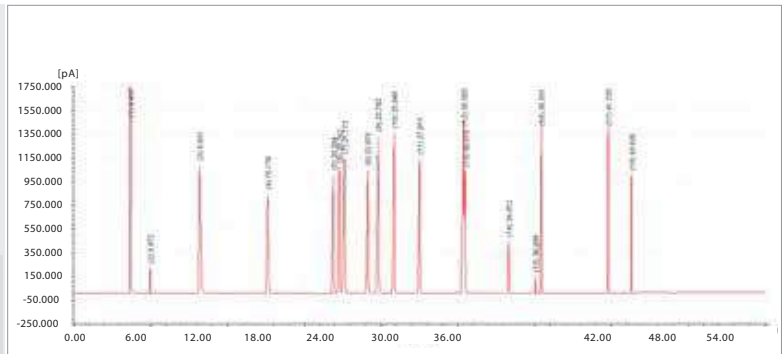


## Aromatic compounds

### Setup

Detector: FID  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: Innowax cap.  
Workstation: Optima-3007

Peak sequence: Benzene, Toluene, Ethane, P-xylene, M-xylene, P-Ethyltoluene, M-Ethyltoluene, S-Butylbenzene, Diethylbenzene, O-diethylbenzene

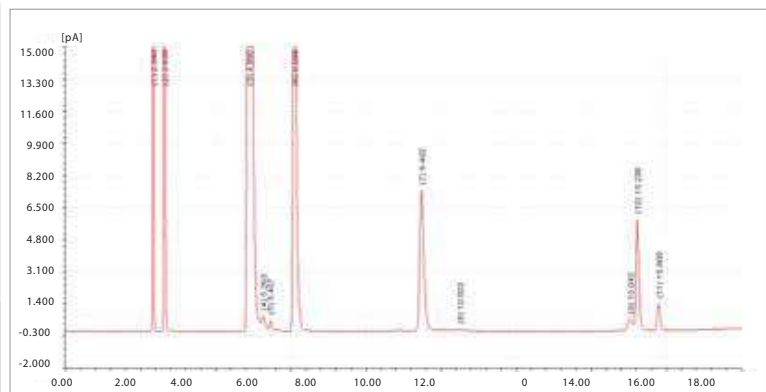


## Dimethyl ether in LNG

### Setup

Detector: FID  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: Gas valve injection  
Column: PLOTQ cap.  
Workstation: Optima-3007

Peak sequence: CH<sub>4</sub>, C<sub>2</sub>H<sub>2</sub>, prepene, propane, methylal, Dimethyl ether, n-butene, cis-bitene, isoamylene, methyl alcohol, n-pentane



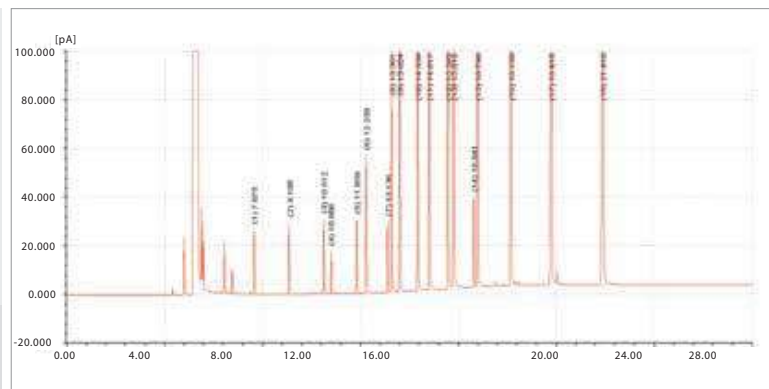
## [ Medicine ]

## Organic acid

### Setup

Detector: FID  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: DB-FFAP  
Workstation: Optima-3007

Peak sequence: acetic acid, propionic acid, butyrate, valeric acid, sovaleric acid, caproic acid, heptylic acid, octanoic acid, n-nonanoic acid, lactic acid, 2-Hydroxy-2-Methylbutyric Acid.

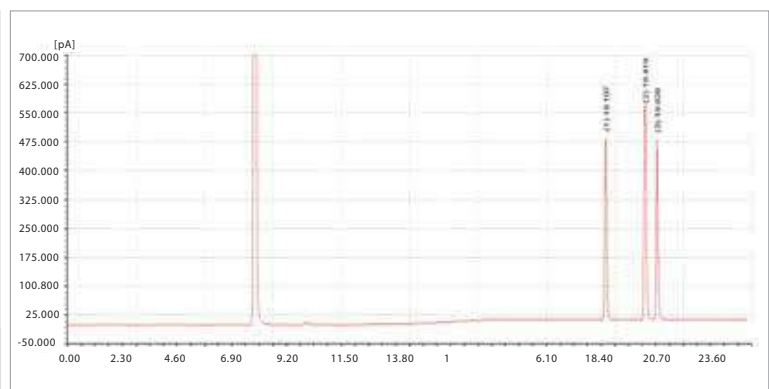


## Cresolisomer

### Setup

Detector: FID  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: specialized for cresol  
Workstation: Optima-3007

Peak sequence: o-cresol, p-cresol, m-cresol



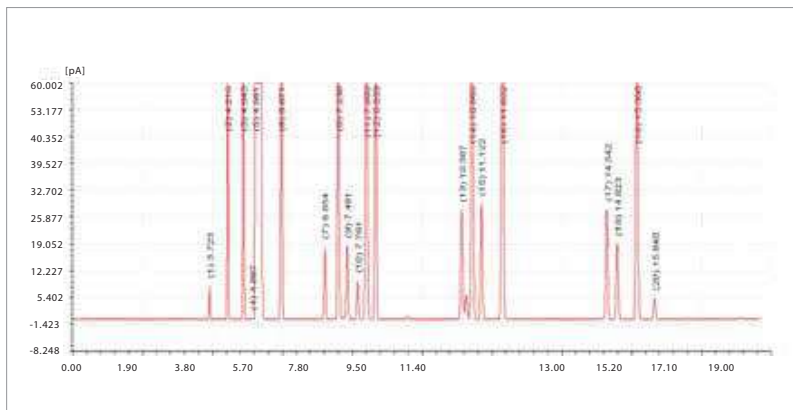


## Organic solvent:

### Setup

Detector: FPD  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: DB-624 cap.  
Workstation: Optima-3007

Peak sequence: methyl alcohol, ethanol, acetone+ isopropanol, acetonitrile, dichloromethane, chloroform, isobutanol, CCl<sub>4</sub>, Benzene, n-heptane, isoamylol, pyridine, toluene, n-amyl alcohol, ethylbenzene, p-xylene, n-Hexanol, o-xylene

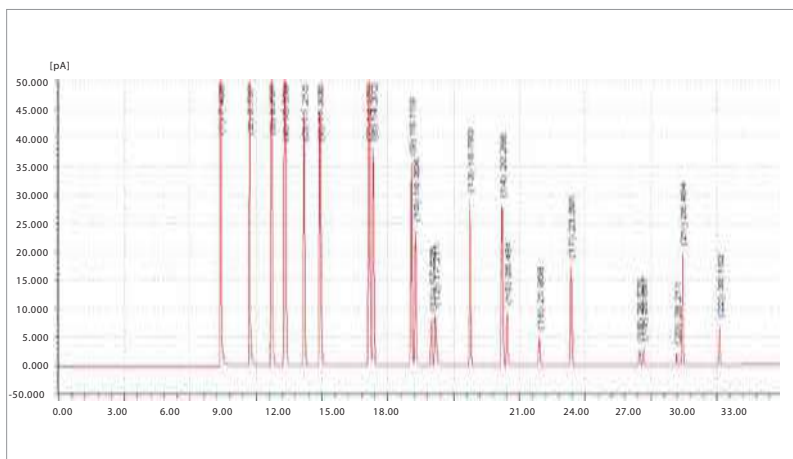


## VOCS2nd-level solution

### Setup

Detector: FPD  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: PC-VOCOL  
Workstation: Optima-3007

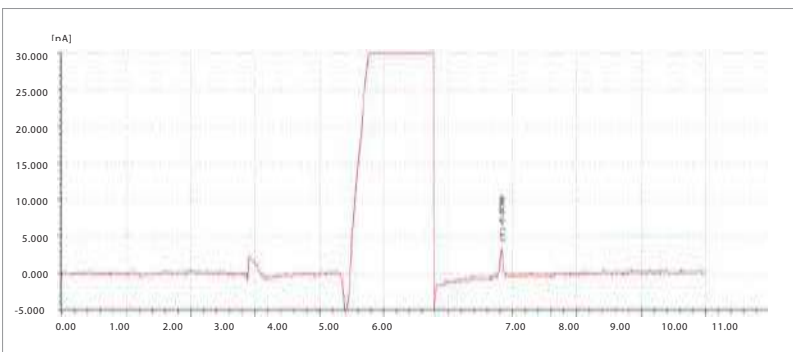
Peak sequence: methanol, ethanol, isopropanol, acetone, methyl acetate, n-butyl alcohol, butanone, ethyl acetate, acetic acid isopropyl ester benzene, 1-Methoxy-2-propanol, propyl acetat, 4-methyl-2-pentanone, 1-Ethoxy-2-propanol, toluene, n-butyl acetate, ethylbenzene, o-xylene, styrene



## 50ppb thiopheneinBenzene

### Setup

Detector: FPD  
Inlet: Capillary  
Gas control module: 2 sets  
Injection mode: liquid autosampler  
Column: HP-Innowax  
Workstation: Optima-3007



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