

Gas Chromatograph

# chrozen GC

This Value Is Not Negotiable

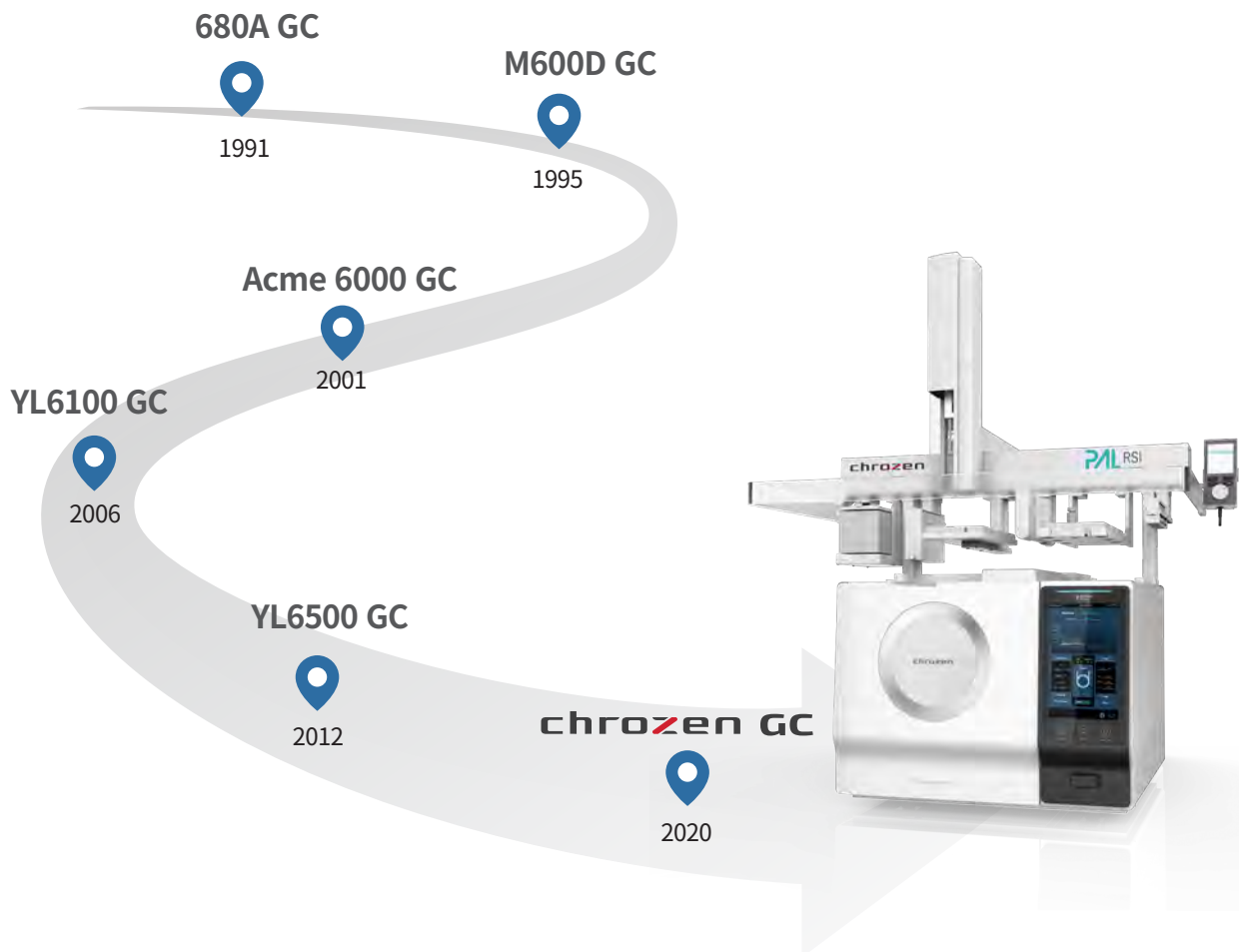


# This Is Enough!

# chrozen GC

**With accuracy and precision for each analysis, we will make a way.**

YOUNG IN Chromass producing reliable and superior chromatographs for over 30 years has proudly launched our 6th generation of GC, the new ChroZen GC, by our commitment to maximize customer satisfaction with our instruments. ChroZen GC equipped with the state-of-the-art technology in both hardware and software enhances the user convenience and the data reliability while delivering the exceptional analytical solutions.



**chrozen** is a brand name of YOUNG IN Chromass products that stands for the combination of **chromatograph** and **zenith**.

# chroZen GC at a Glance

The brand new ChroZen GC with its fancy design and intuitive LCD display features substantially enhanced sensitivity and reproducibility by its **powerful UPC (Ultimate Pneumatic Control)** to enable more reliable and accurate data.

## More Than Smart Things

Intuitive touchpad LCD display (10.1") monitoring equipped modules (inlets, detectors, oven) at a glance and chromatogram as well as temperature programming in real time

## More Than Innovation

- Substantially **enhanced sensitivity** by the efficient EMI (Electromagnetic Interference) shielding and other robust electronic parts
- **Pulsed pressure mode (Split/Splitless)**: Instantly increased forefront pressure at injection minimizes the sample dispersion to provide significant sensitivity
- **Various detectors with superior sensitivity available**

## More Than Reliability

- Powerfully designed UPCs(Ultimate Pneumatic Control) to optimize carrier gas control to provide exceptional accuracy and precision (**RT Repeatability SD < 0.0008 min**)
- 15 heated zones to achieve optimized thermal stability for each module (**Temperature Stability <  $\pm 0.01^{\circ}\text{C}$** )
- Ultra-high speed motor to speed up the oven cooling down time for improved productivity (**450°C→50°C: < 3.8 min**)

## More Than Solution

- Various dedicated analyzers fully configured (Up to 9 UPCs) for food, pharmaceutical, petrochemical and environmental application field that are supporting numerous standard methods such as ASTM D1945, ASTM D2163, ASTM D4059, ASTM D4815/5580, ASTM D5623, ASTM D6730, ASTM D7823 and ASTM D8071
- Extended inlet pressure range (~150 psi)
- Safe use of Hydrogen as carrier gas for superior productivity and sensitivity by H<sub>2</sub> leak sensor
- SmartFlow Kit for backflush, 2D GC or heart-cut application to optimize analytical efficiency in multiple way



# Accuracy and Precision is what ChroZen GC values most.

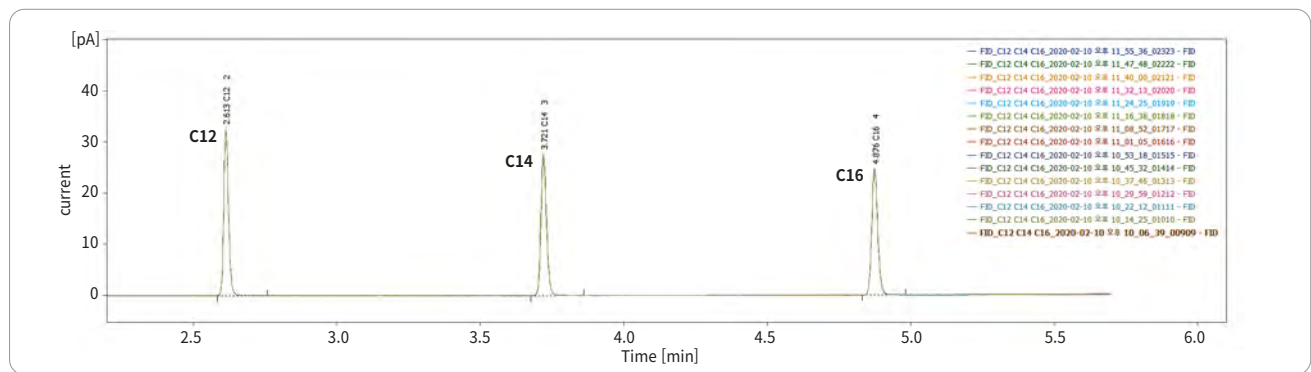
ChroZen GC with powerful and stable UPCs (Ultimate Pneumatic Control) ensures data reliability and facilitates the most remarkable repeatability in both RT (Retention Time) and area that considered as one of significant factors for estimating how good the GC performs.

RT(min)	C12	C14	C16
1	2.6125000	3.7200000	4.8750000
2	2.6125000	3.7200000	4.8750000
3	2.6125000	3.7208333	4.8758333
4	2.6125000	3.7208333	4.8750000
5	2.6125000	3.7200000	4.8750000
6	2.6125000	3.7208333	4.8741667
7	2.6125000	3.7200000	4.8750000
8	2.6133333	3.7208333	4.8758333
9	2.6133333	3.7208333	4.8750000
10	2.6133333	3.7216667	4.8750000
11	2.6133333	3.7200000	4.8750000
12	2.6133333	3.7208333	4.8750000
11	2.6133333	3.7208333	4.8758333
12	2.6125000	3.7208333	4.8750000
13	2.6133333	3.7208333	4.8758333
<b>SD(min)</b>	<b>0.000416</b>	<b>0.000478</b>	<b>0.000451</b>

**RT Repeatability SD < 0.0005 min**

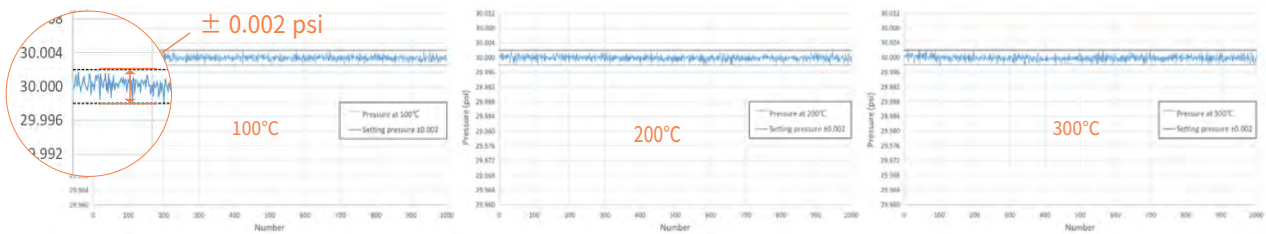
Area(pA.s)	C12	C14	C16
1	0.3732875	0.3704902	0.3615789
2	0.3768552	0.3718810	0.3651483
3	0.3745179	0.3717736	0.3644548
4	0.3759930	0.3721659	0.3660563
5	0.3745244	0.3715350	0.3663568
6	0.3743780	0.3714631	0.3644980
7	0.3760052	0.3735342	0.3655185
8	0.3752988	0.3718196	0.3654820
9	0.3746218	0.3712330	0.3646219
10	0.3753269	0.3724284	0.3642208
11	0.3759125	0.3734419	0.3666292
12	0.3747429	0.3713757	0.3645661
11	0.3733229	0.3689732	0.3628517
12	0.3762151	0.3725241	0.3656627
13	0.3767046	0.3730961	0.3653833
<b>%RSD</b>	<b>0.285095</b>	<b>0.301063</b>	<b>0.348607</b>

**Area Repeatability RSD < 0.5%**



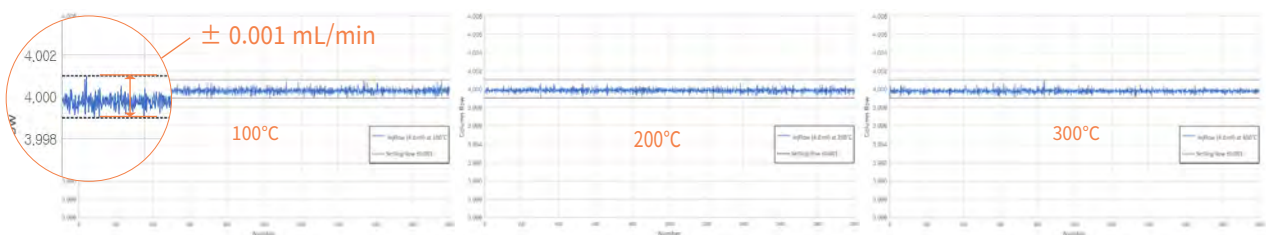
< RT Repeatability and Area Repeatability Data in 15 Sequence Injections >

## Pressure Stability with Temperature Change $\leq \pm 0.002$ psi



## Flow Stability with Temperature Change $\leq \pm 0.001$ mL/min

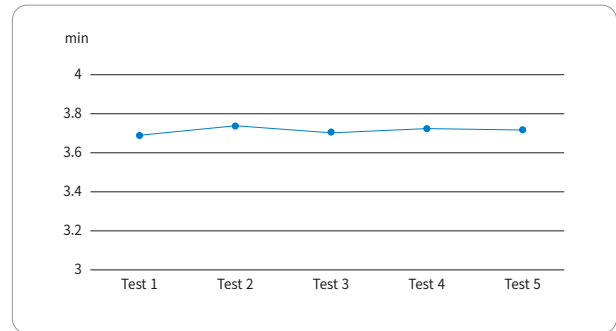
- column flow rate = 4 mL/min
- measurement time = 10 min



# Nothing More Valuable than Your Time, ChroZen GC

**Faster,** The faster it cools down, the more time you save.

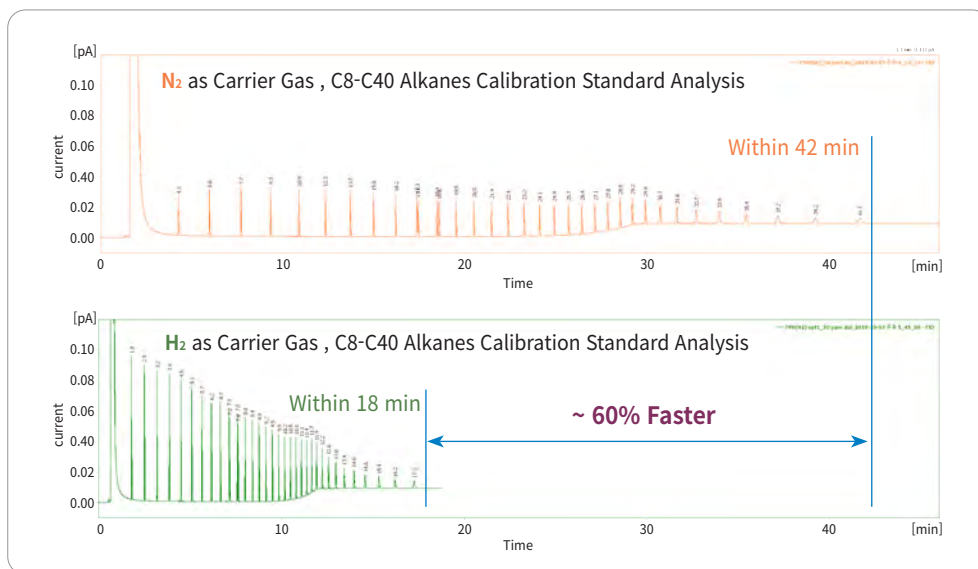
Ultra-high speed motor enables to speed up the oven cooling down time to reach within 3.8 minutes from 450°C to 50°C, which leads users to reduce the analysis time to improve productivity.



<450°C→50°C Cooling Time Test>

**Much Faster,** 50~70% decrease in the average analysis time with H<sub>2</sub> as a carrier gas!

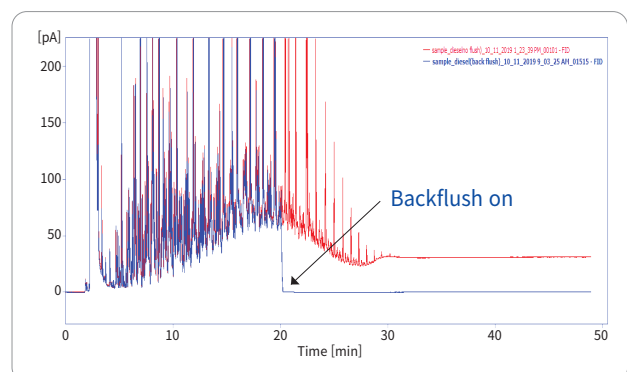
The Van Deemter equation describes the column efficiency varying with mobile phase velocity and hydrogen has much greater velocity range while providing the desired separation and optimizing overall productivity. Thus, using a hydrogen as a carrier gas can lead significant time saving and the faster linear velocity eluted components faster that ends up with more narrow peaks, higher sensitivity in other words, while maintaining peak separations. However, all of these benefits should come with safety, which can be ensured by ChroZen GC equipped with hydrogen leak sensor to avoid much of the risk.



<Comparison of Hydrogen and Nitrogen as a Carrier Gas>

**Much Longer,** Consider target compounds only for column longevity by backflush

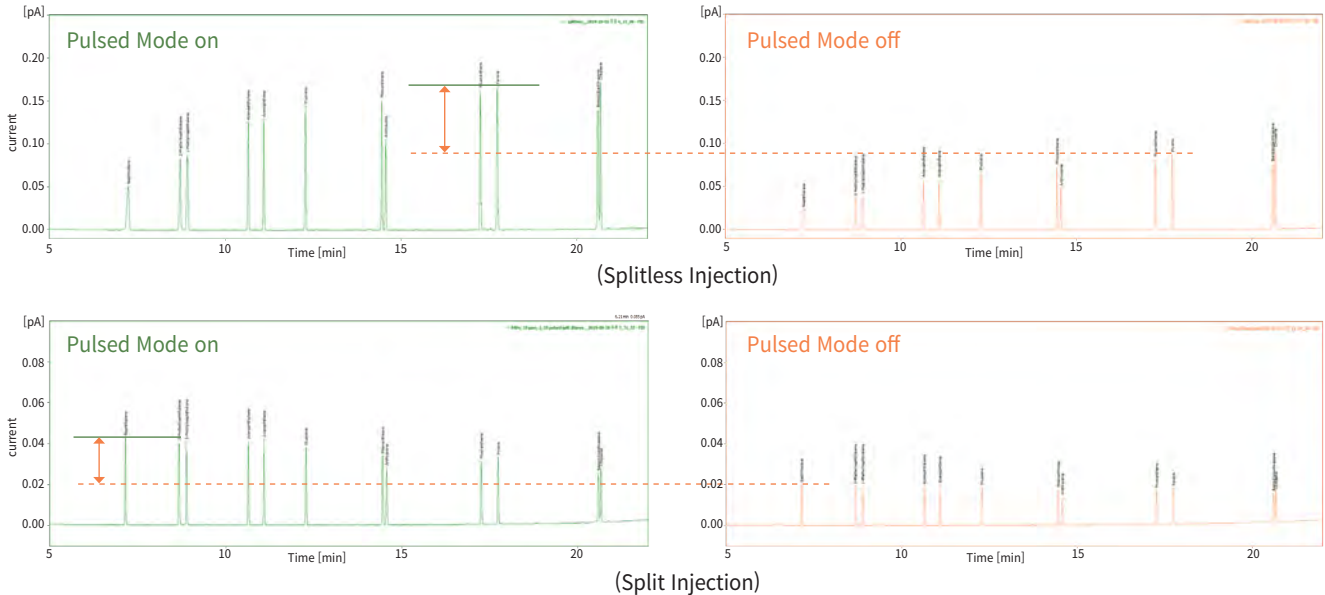
Backflush technique delivers the decrease in analysis time as well as the enhanced column life time by reversing the column flow after target compounds are eluted to cut the unnecessary procedure. ChroZen GC can be simply configured by adding the complete module and it gives very precise and accurate flow control for the remarkable reproducibility.



# ChroZen GC Is on the Ball, Superior Sensitivity

## Pulsed Pressure Mode (Available with Capillary Inlet)

In the pulsed pressure mode, ChroZen GC instantly increases forefront pressure at injection to avoid the sample dispersion and minimizes backflash exceeding the liner volume as well as carry-over to provide significant sensitivity.

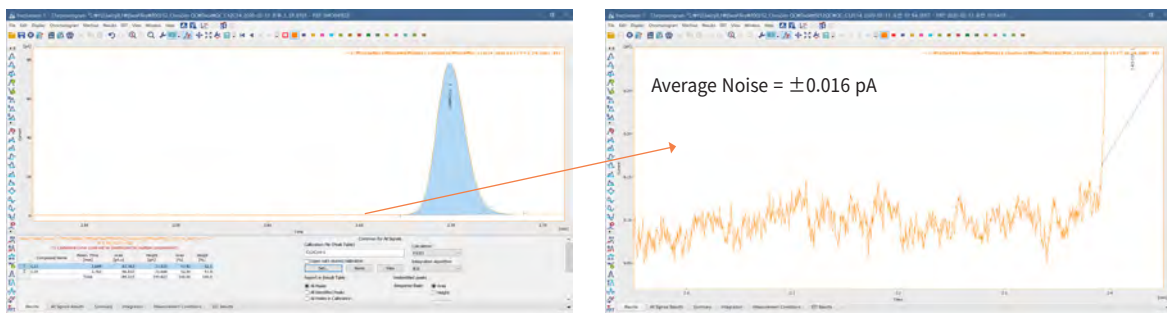


## Enjoy the Variety, Remarkable Detectors

There are various detectors with superior sensitivity available for users' demands depending on their applications to make the analysis results more efficient and accurate.

- Flame Ionization Detector (FID)
- Micro-Thermal Conductivity Detector ( $\mu$ TCD)
- Pulsed Discharge Detector (PDD)
- Flame Photometric Detector (FPD)
- Photoionization Detector (PID)
- Vacuum Ultraviolet Detector (VUV)
- Thermal Conductivity Detector (TCD)
- Nitrogen Phosphorus Detector (NPD)
- Micro-Electron Capture Detector ( $\mu$ ECD)
- Pulsed Flame Photometric Detector (PFPD)
- Mass Spectrometer (MS)

FID (Flame Ionization Detector), as one of these detectors, which is widely used for detection of hydrocarbons ensures extraordinary sensitivity with less than 1.2 pg C/s MDL (Minimum Detection Limit). After conducting thousands of sequential tests for baseline noise and drift, our FID remains stable and reproducible data, which enables data reliability.



<MDL of FID in Real Data, 1.05 pg C/s>

# Judge a Book by Its Cover! Stuffy Laboratory, Get Beauty

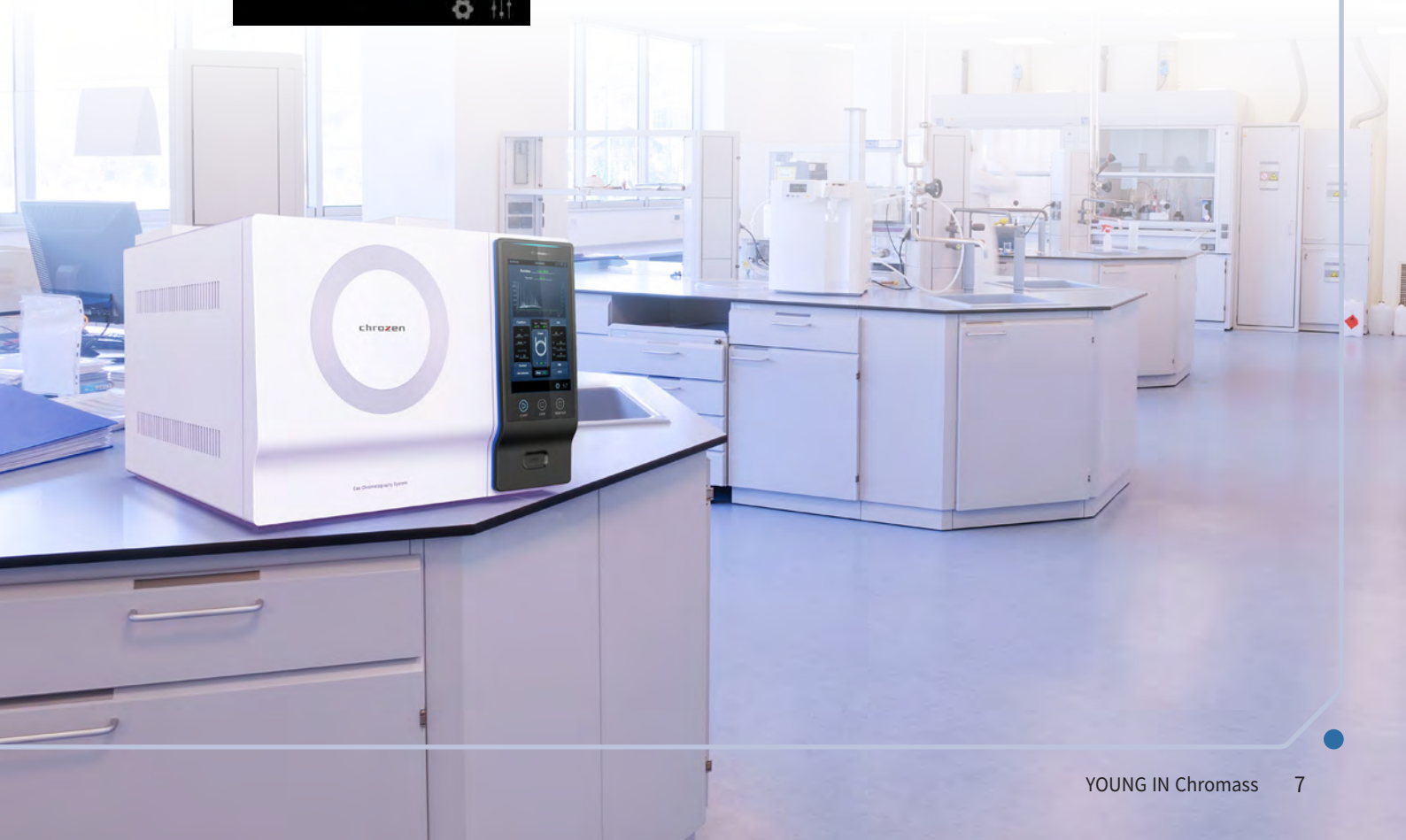
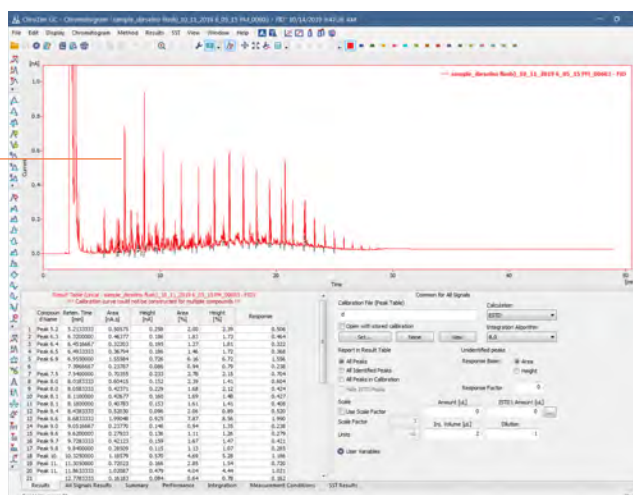
ChroZen GC with its fancy design is equipped with the intuitive touchpad LCD display (10.1"), which enables easy control of all the installed modules (inlets, detectors and oven) and monitors chromatogram as well as temperature programming steps in real time to control whole process at a glance.



## High Resolution Vivid LCD with Intuitive GUI



Chromatogram Monitoring in Real Time



# chroZen GC/MS

ChroZen GC/MS is an innovative single quadrupole mass spectrometer to carry out qualitative and quantitative analysis for unknown or complex samples in trace level. With its standout ultra-inert ion source called UEIS (Ultra Efficiency Ion Source), it minimizes the contamination to ensure both ideal repeatability and sensitivity.



## More Than Sensitivity

- UEIS(Ultra Efficiency Ion Source) with each enhanced part such as lens and pre-filters to maximize efficiency of ionization for superior sensitivity
- EM (Electron Multiplier): Six spiral multiplier to increase linear output current for excellent sensitivity (SNR 2500:1, IDL < 10 fg)

## More Than Performance

- Wide mass range: 1.4~ 1,200 amu
- Rapid scan speed: ~20,000 amu/sec

## More Than Reliability

- High capacity of turbo pump: 240L/sec of standard vacuum system for fast stabilization
- Double filament: Uninterruptible and stable analysis to minimize instrument downtime
- Ultra-inert ion source, pre-filter and quadrupole to reduce contaminations

## More Than Variety

- EI as standard and CI (PCI & NCI) as option
- Scan, SIM, Simultaneous Scan/SIM mode
- Various library support depending on application

# chroZen GC/VUV Detector

The VUV (Vacuum Ultra Violet) detector is a universal mass-sensitive gas chromatography detector, which provides both qualitative and quantitative data applying the fact that almost every chemical compound including many isomers absorbs strongly in this wavelength range (115 – 185 nm). The measured spectra can be matched against an existing compound specific absorption cross section library to rapidly identify the compounds (ASTM 8071 support).



## Identification and Quantification of Compounds Including Isomers

It is able to uniquely identify compounds, including most isomers. The library search algorithm provides correct and unambiguous identification of your compounds.

## Minimized Sample Degradation

No ionization reduces sample degradation and this leads superior repeatability and reliability.

## Accurate Quantification of Coeluting Compounds

This delivers the ability to deconvolve co-eluting peaks, providing a unique orthogonal separation approach.

## Convenient Maintenance

No vacuum pumps or ion source required and easy to replace a deuterium lamp to reduce instrument downtime.

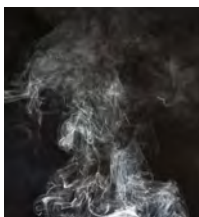


# Of the User, By the User, For the User

## Dedicated Analyzer

Our accumulated experience in gas chromatography and devotion for customers' satisfactions led to supply one stop solution for various dedicated applications. You only need to let us know what to analyze, and then every single component that is required to analyze your sample will be configured right away.

### Natural Gas Analyzer



Natural Gas Analyzer with accurate valve switching function vents unnecessary components and sends significant things in time to the appropriate columns and detectors for optimized analysis of natural gas containing low level of oxygen (< 3%), isomers and compounds more than C4 which are not needed for analysis results.

\* Standard Method Support: ASTM D1945, etc.

### Refinery Gas Analyzer



With the availability of no. of installation (3 for each detector and inlet), Refinery Gas Analyzer can configure several columns, switching and sampling valves as well as the appropriate detectors to analyze the complex and difficult refinery gas samples.

\* Standard Method Support  
: ASTM D4815, D5580, D7423, D6730, D1946, etc.

### Residual Solvent Analyzer



Residual Solvent Analyzer coupling with headspace autosampler can accurately and efficiently detect and quantify residual solvents found in the inks used for the printing of packaging and raw materials for food and drug products, which are known to be hazardous to human health if ingested.

### Residual Pesticide Analyzer



Residual Pesticide Analyzer equipped with ECD or NPD is the optimized system to separate complex mixture of compounds containing organophosphorus and organochlorine pesticides and to run EPA methods. We also provides the analyzer equipped with GC/MS for quantitation of pesticides at trace levels.

### Fatty Acid Analyzer



Fatty Acid Analyzer is suitable to analyze various fatty acids to determine the ratio of saturated fatty acids and unsaturated fatty acids in fat and provides all the solution from the preparation to the method set-up.

### Phthalate Analyzer



Phthalate Analyzer excels at detection and quantitation of regulated phthalates that became concern and into force in restrictions on the use of certain substances such as children's toys, medical devices and food packaging, which are directly related to the human health.

### VOC Analyzer



VOC analyzer optimized to analyze VOCs in aqueous samples that can have a bad long-term influence on human health accurately analyzes trace level of VOCs (ppt level by P&T or SPME Arrow). It equips all necessary configuration for the analysis including detailed procedures and protocols, which are in full compliance with approved U.S. EPA methods.

### Biodiesel Analyzer



Biodiesel Analyzer identifies and quantifies impurities in biodiesel as an alternative fuel today and provides all solution including the sample preparation and the method set-up while achieving excellent reproducibility and resolution.

### Sulfur Analyzer



Sulfur Analyzer provides increased sensitivity and selectivity with PFPD (Pulsed Flame Photometric Detector) for the analysis of sulfur compounds at trace levels as well as the analysis method achieving ASTM 6228.

# Save Your Time in Laboratories

## Liquid Autosampler



YL3000A Liquid Autosampler



YL3100A Liquid Autoinjector



YL3200A Premium Liquid Autosampler



ChroZen PAL LSI

### YL3000A Series Autosampler

Its sophisticated sampling techniques provide the variable needle depths to draw the sample anywhere within the vial allowing you to use various types of syringes with volume from 0.5 to 100  $\mu$ L to cover the widest range of applications.

- **The self-aligning “plug and play”:** Easy positioning/Installation/re-positioning
- **Full-color touch screen interface:** Easy system accessibility and usability
- **Double wash step capability:** Pre-and post-wash for superior analytical performance (carry-over free)
- **Syringe illumination:** Easy check against air bubbles in method validation
- **Syringe ID:** Automated syringe identification and tracking of the syringe consumption based on RFID tags

### ChroZen PAL LSI

ChroZen PAL LSI (Liquid Sample Injection) System can reach any three-dimensional position within its working space and is ideally suited to pick and place objects like vials. It can inject from several sample containers into different inlets or transport vials from a tray to a temperature controlled modules like the peltier stack for cooling them down to 4°C.

- **Large sample capacity:** 648 position of 2 mL vials
- **Discrimination free injection:** Ultrafast injection down to 100 msec reduces needle discrimination in GC to C40/C20 > 0.98

	YL3000A	YL3100A	YL3200A	ChroZen PAL LSI
Operation Type	Tray in-out and Turret	Rack-Turret	Tray in-out and Turret	X - Y - Z Position
Sample Capacity (2 mL)	121 vials	15 vials (20 vials as Option)	209 vials	Max. 648 vials
Washing Vial	6 (10 mL)	6 (10 mL)	6 (10 mL)	4 (10 mL) or 2 (100 mL)
User Interface	Touch Screen/ Software	Key Pad/ Software	Touch Screen/ Software	Handheld Controller/ Software
Dual Injection (In Sequence)	Available	Available	Available	Available
Integrated Bar Code Reader	N/A	N/A	Available as Option	Available as Option
Syringe ID	N/A	N/A	Available	N/A

## Headspace Autosampler



YL2000H Headspace Autosampler



YL2100H Headspace Autosampler



Versa  
Headspace Autosampler



HT3  
Static and Dynamic Headspace Autosampler

### YL2000H Series Headspace Autosampler

The YL2000H with a heated gas-tight syringe eliminates tubing, dead volume and sample absorption for system robustness and low maintenance frequency and its compact installation on most GCs allows you to utilize headspace technology in the efficient way.

- User-friendly touch screen
- Easy installation on most GCs
- Adjustable sample volumes without loop changes

### Teledyne Tekmar Headspace Autosampler

Versa and HT3 headspace autosamplers equipped with inert sample pathway including transfer line, sample needle and loop provide superior analytical results by eliminating adsorption and reducing carryover.

	YL2000H	YL2100H	Versa	HT3
Injection Type	Gas Tight Syringe	Gas Tight Syringe	Pressured Loop	Pressured Loop
Extraction	Static HS	Static HS	Static HS	Static & Dynamic HS
Sample Capacity	42 vials (20 mL)	14 vials (20 mL)	20 vials (22 mL)	60 vials (9, 12, 22 mL)
Oven Position	6	1	1	10
Interface	Touch Screen /Software	Keypad /Software	Software	Software
Injection Volume (Standard)	2.5 mL	2.5 mL	1 mL	1 mL
Injection Volume (Option)	1, 5 mL	1, 5 mL	100, 250, 500 $\mu$ L and 2, 3, 5 mL	100, 250, 500 $\mu$ L and 2, 3, 5 mL

## All in One Autosampler



YL2800T All in One Autosampler



ChroZen PAL RSI/RTC

### YL2800T Series Autosampler

YL2800T is a single unit combining static headspace analysis, liquid sample injection and SPME (Solid Phase Micro-Extraction) as an option.

### ChroZen PAL RSI/RTC System

ChroZen PAL RSI/RTC system can be adapted or extended to provide the combined injection techniques such as static headspace injection, liquid injection, SPME (Solid Phase Micro Extraction) and ITEX (In-Tube Extraction) dynamic headspace in one instrument. ChroZen PAL RTC system provides same reliability, flexibility and productivity as the RSI system but it additionally offers the robotic tool change that switches between different tools automatically.

Applying smart syringe technology with ID chip, it automatically preset all of syringe parameters, ranges and usage tracking for users' convenience.

# Sample Preparation System



## Lumin Purge and Trap Concentrator

The Lumin Purge and Trap Concentrator (PTC) is a sample preparation instrument used to remove Volatile Organic Compounds (VOCs) out of aqueous and solid sample types using Helium or Nitrogen.



## AQUATEk LVA Waters-only Autosampler

The AQUATEk LVA is a Purge and Trap (P&T) Autosampler that automates the sample preparation steps for the analysis of liquid samples via purge and trap. The system is capable of preparing samples such as drinking water and wastewater.



## Atomx XYZ Automated VOC Sample Prep System

The Atomx XYZ is the second generation combined soil/water autosampler and purge and trap concentrator system to analyze VOCs. It provides 84-position vial tray with optional vial chiller to 4°C and the improved moisture control system reduces the amount of water transferred to the GC.



## Pyrolyzer, Pyroprobe 6000 series

Pyrolyzer coupled with ChroZen GC allows you to analyze the samples such as paint, tapes, caulk, adhesives, food packaging, rubber, plastic, papers, ink, coating and a full range of household products without extractions or derivatizations for qualitative and quantitative information.

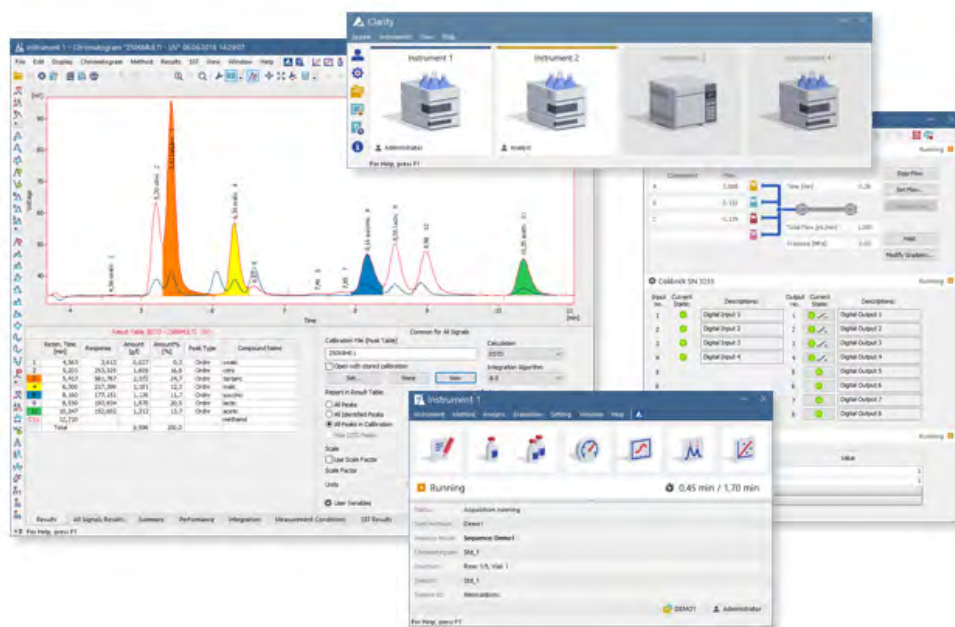


## Gas Sampling Valve/Purge Housing

In order to obtain accurate results in gas analysis, it is necessary to equip with a gas sampling valve in the front of column. The gas sampling valve enables manual or automatic gas sample injection and flow switching. Our gas sampling valve is operated by an air actuator or  $\mu$ -electronic actuator which opens and closes it. The Purge housing eliminates any possible diffusion from the atmosphere into the valve, or safely vents fugitive emissions from the valve to analyze samples of O<sub>2</sub>, N<sub>2</sub>, etc at low concentration of a few ppms.

# Powerful and Intuitive Control, YL-Clarity

The sophisticated YL-Clarity chromatography data system is easy to use and offers extensive data management plus full control of our GC products by its intuitive user interface. The software is designed for 21 CFR Part 11 Compliance and full compatibility with MS Windows OS and seamlessly handles data processing and instrument control using an ultra-reliable LAN communication.



- List of Controllable Instruments: ChroZen GC, ChroZen GC/MS, YL6500 GC, YL6900 GC/MS, ChroZen UHPLC, YL9100 Plus HPLC, YL9300 HPLC, YOUNG IN Chromass autosamplers
- MS Windows Compatibility: Vista, 7, 8, 10
- Optional Module**
  - SST (System Suitability Test) MS Control
  - NGA (Natural Gas Analysis) DHA (Detailed Hydrocarbons Analysis)
  - PDA Extension Validation Kit
  - GPC Extension
- 21 CFR Part 11 Compliance: Management of user accounts, audit trail and electronic signature
- Simultaneous data acquisition from up to four independent chromatographs: Each chromatograph can acquire data from up to 32 detectors.

## Powerful GC/MS Library

Various GC/MS Libraries are available depending on specific applications with multiple information of each compound's spectra, chemical structure and retention index to get the accurate and reliable data.

GC - MS Data			
Library	Wiley Registry 11 <sup>th</sup> Edition	NIST 2017	WR11/N17 GC-MS Total
Spectra	775,550	306,622	>1,007,924
Chemical Structures	741,000	262,157	>973,366
Compounds	599,700	262,157	>730,000



# Gas Generator



## Hydrogen Generator (NM-H<sub>2</sub>-Plus, PG-H<sub>2</sub>-Plus)

There are 2 types of hydrogen generators provided, which are NM-H<sub>2</sub> Plus series and PG-H<sub>2</sub> Plus series to be used in the proper application depending on the purity of hydrogen and the way of cartridge maintenance. Hydrogen generator eliminates dead time for gas bottle changeover and the risk of explosion while providing enhanced data reliability.



## Air Generator (Zero Air-GC Series/Ultra Zero Air-GT Series)

Air Generators produce dry and hydrocarbon-free air (NO<sub>x</sub>/SO<sub>x</sub> free and CO<sub>2</sub> free with GT series) by using air from oil free compressors, thus avoid the need to use conventional bottles that are often complex to change. With this zero air, you can decrease the background noise level because it gives the baseline much better stability, considerably increasing detector sensitivity and ensuring precise analytical results.



## Hydrogen + Air Generator (FID Tower NM Plus, FID Tower PG Plus)

The FID Tower Plus hydrogen and air generator uses the latest technology in PEM (Polymer Electrolyte Membrane) for the production of pure hydrogen. Its vertical design allows positioning in over the laboratory bench so it requires only small space near your GC, optimizing the space you need.



## N<sub>2</sub> Generator (N<sub>2</sub> Tower Plus)

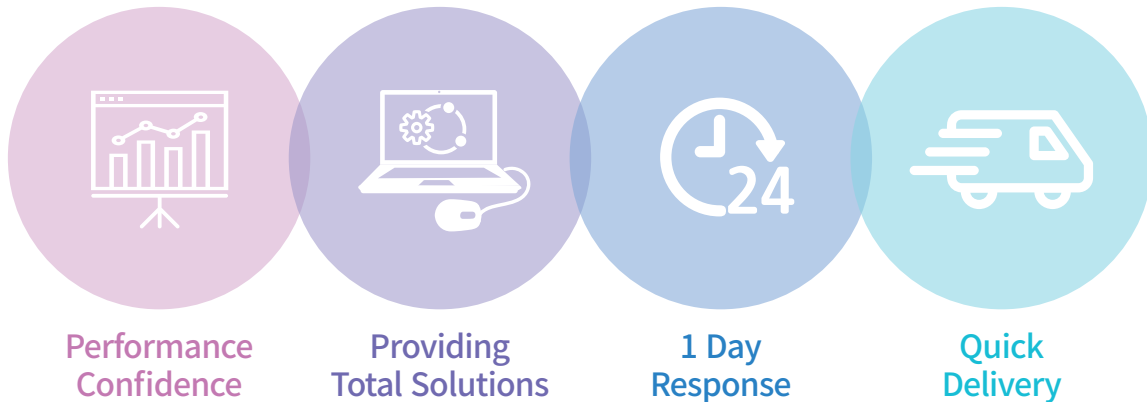
N<sub>2</sub> TOWER Plus produces high purity N<sub>2</sub> (up to 99.999%) for all major applications in analytical laboratories. Nitrogen generators eliminate the typical problems associated with the handling of high pressure gas tanks while reducing the cost for high purity nitrogen at the same time.

# YOUNG IN Chromass

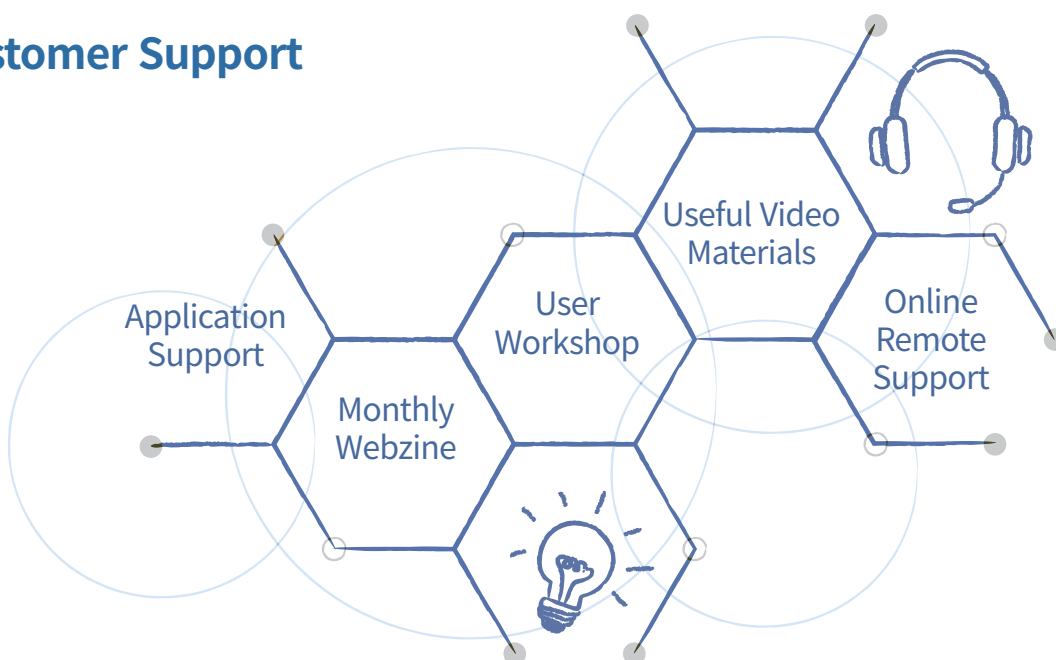
As one of the leading analytical instrument manufacturers, YOUNG IN Chromass has produced reliable and superior chromatographs over more than 30 years by dedicating our research and development to chromatographic technologies in Korea.

We provide our customers with reliable analytical instruments at reasonable prices and keep constantly collaborating with our customers and sharing with them valuable information on experiments in science, on chemical analysis and all others. In more than 50 countries, we are ready to back you up, relying on our well-trained distributors wherever and whenever new needs arise. We will provide our best support for all of our customers to select optimal instruments with a right solution to application and by expanding our valuable research and experiments.

## Our Mission Is to Provide Entire Solutions for Chromatography



## Customer Support





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Young In Chromass products are endorsed by  
Korean PPS(Public Procurement Service) in  
recognition of their excellent technologies and  
the product quality.