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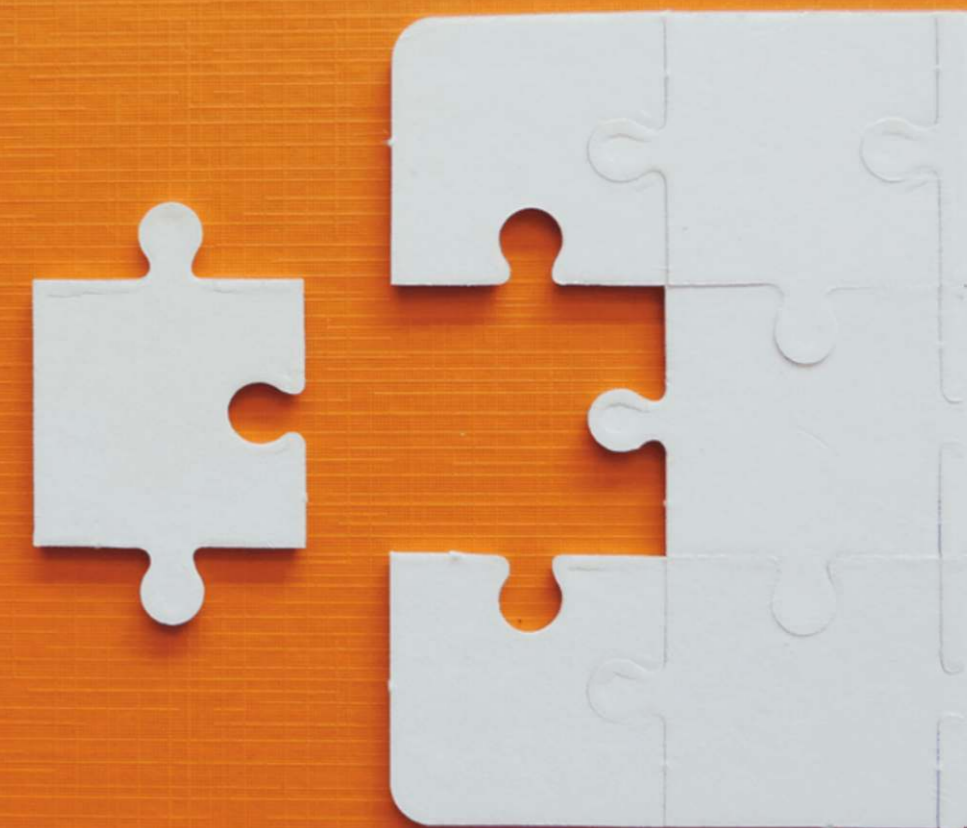
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CHROMATEC JSC SDO, 2019
Russia, Yoshkar-Ola
09-200-9042EN

Any information and technical specifications presented in
this document may be changed unilaterally without notice.

SOLVING EVERY PUZZLE

with new ADVIS™
technique



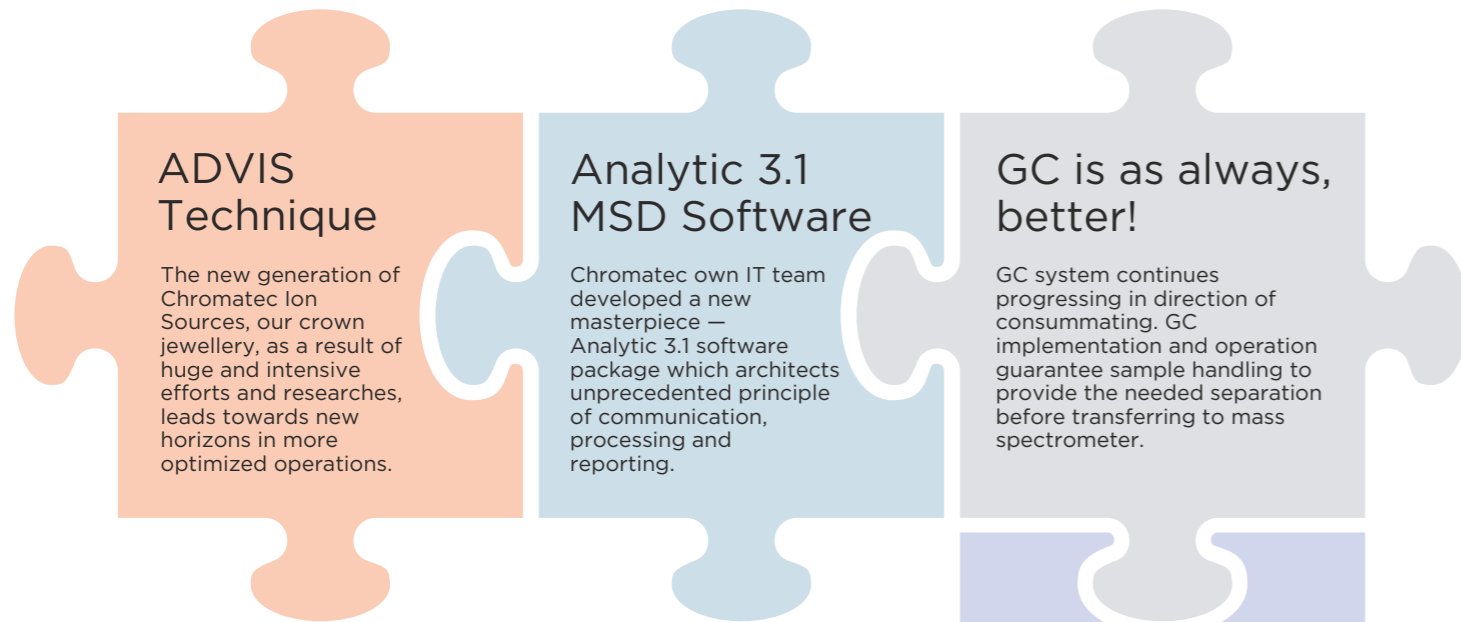
FROM THE HOMELAND
OF CHROMATOGRAPHY

CHROMATEC CRYSTAL GC-MS
Gas Chromatograph
Mass-Spectrometer

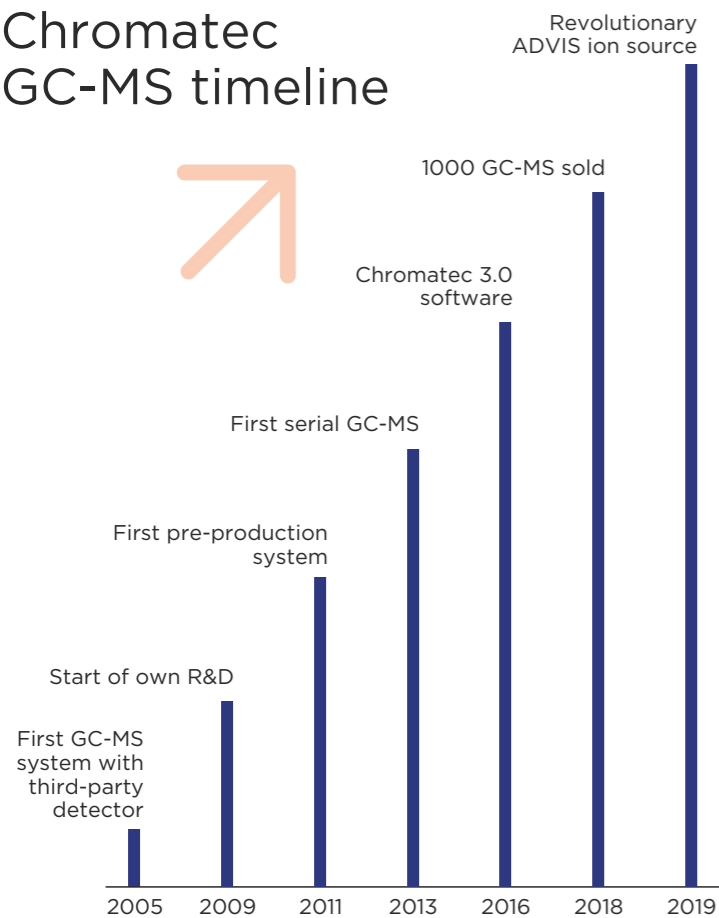


Chromatec

Chromatec Crystal GC-MS with ADVIS technology is a result of decades of experience in design, developing and manufacturing in the field of gas chromatography and mass spectrometry. Our everyday goal is to create a reliable and affordable analytical system with characteristics up to the world standards. Our hard work resulted by a cost-efficient and user-friendly solution demonstrating exceptional sensitivity and stability. Chromatec Crystal GC-MS covers a wide range of applications for all laboratories.



Chromatec GC-MS timeline

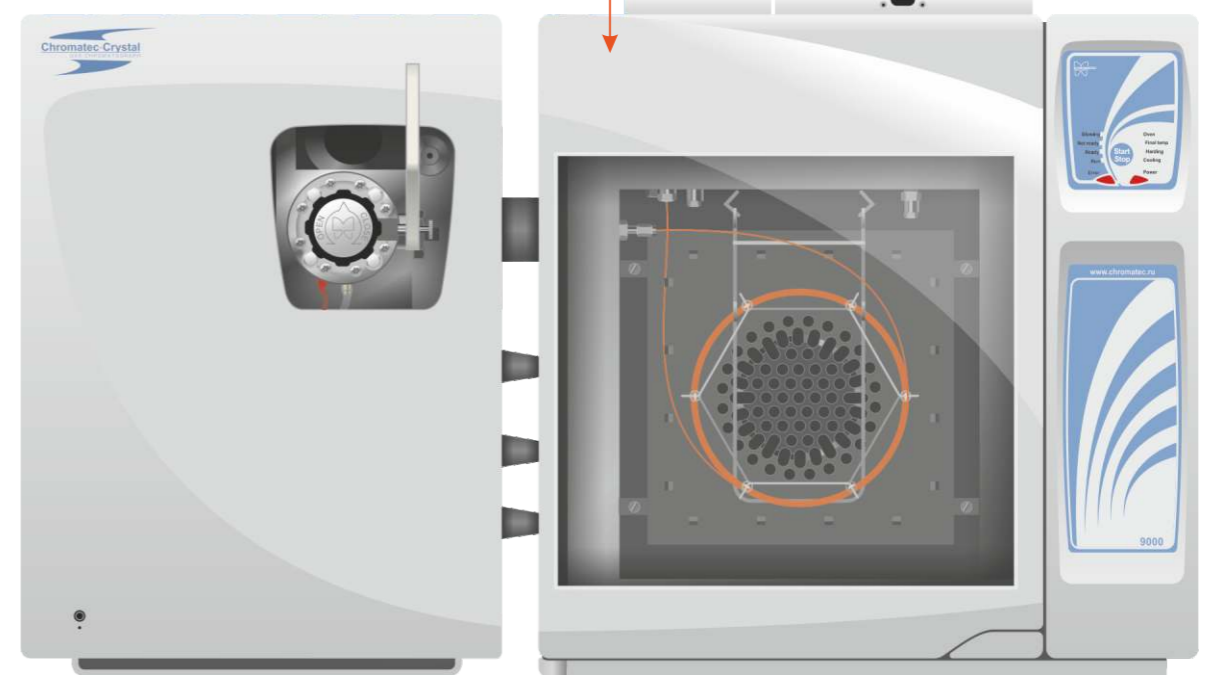


Extended warranty
Feel calm! Chromatec offers different extended warranty plans with affordable cost. Count on us for your long-term plans and get the help and support for confident and continuous work.

Eco-friendly operation
Chromatec is guided by the objectives of improving operational efficiencies in energy and gas consumption. Chromatec Crystal GC-MS has all the smart functions to reduce the power and gas consumption between analyses and during other periods of inactivity.



Chromatec Crystal 9000 GC product line has a comprehensive variety of different possible configurations including vast range of inlets, GC detectors, autosamplers and many other accessories. The singularity of GC design paves the way to offer unrepeatability capabilities to accept many different units.

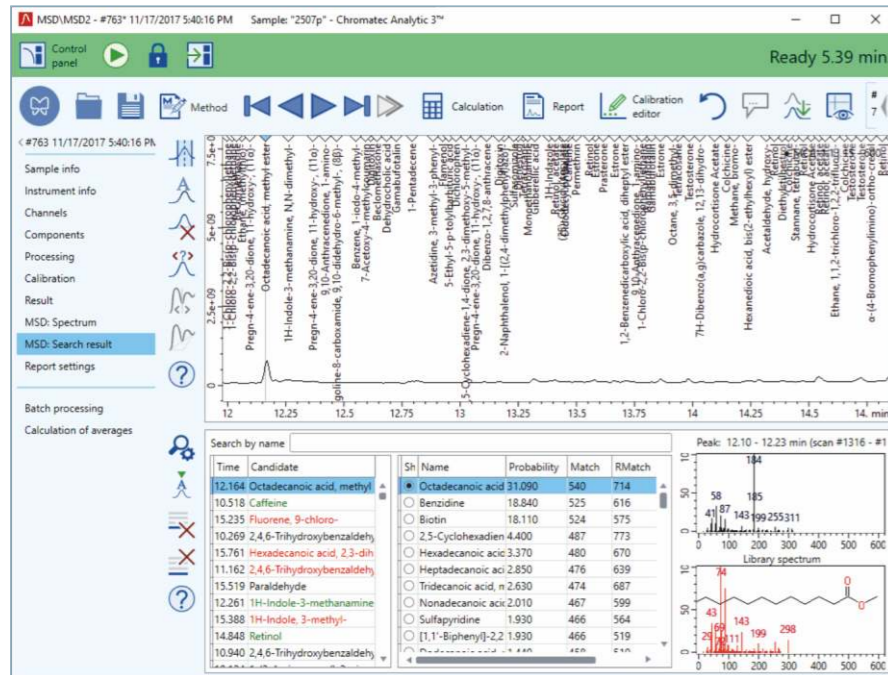
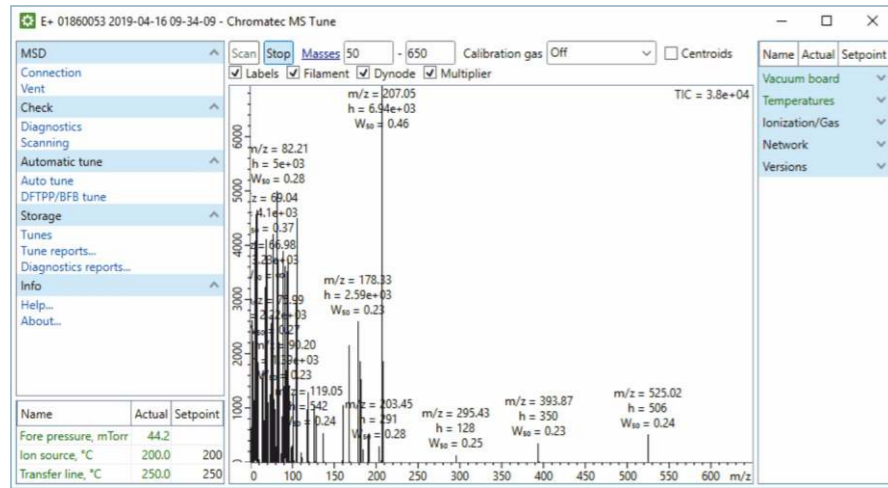


- 
Liquid
- 
Headspace
- 
Purge & Trap
- 
Pyrolizer
- 
TDS
- 
DPS

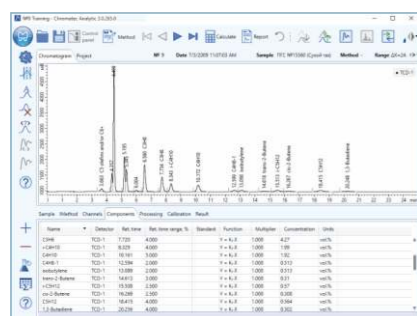
Always looking to erase the limits

Thanks to Chromatec specialization in Gas Chromatography manufacturing allows offering enormous accessories and peripheral devices. Beside the already-available large number of standard analyzers, Chromatec offers additional services to design special engineering solutions upon request for rear and uncommon analytical tasks.

Avant-garde approach in communicating human with machine!



Chromatec Analytic 3.0



Works Faster!

Thanks to the new platform and processing core of Chromatec Analytic 3.1 the workflow processing is unprecedentedly faster. Therefore, handling of capacious mass spectrometry data files gets more comfortable.



Chromatec Analytic 3.1 is a specialized chromatography and mass-spectrometry software that analytical chemistry professionals can rely on to obtain everyday's objectives.

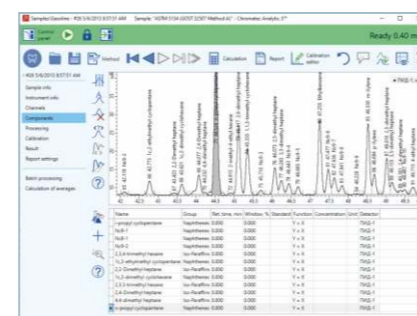
- Variable communication interface (LAN or Wireless)
- Full automatic instrument control
- Accurate automated and manual tuning
- Easy method set-up and applying
- Convenient either for long sample sequence or single run
- Sophisticated trouble diagnostics and helpful feedback

And

it is a chromatography data system (CDS) containing major tools for data handling, processing and reporting:

- Easy understandable for new users
- Visually apparent integration events
- Retention Time Fixing
- Handful tools for qualitative and quantitative
- Customized add-ons for non-standard calculations
- Outfitted by all needed for attracted reports

Chromatec Analytic 3.1



Libraries

Compatibility with all world-known libraries:

- NIST™
- Wiley™
- Pfleger-Maurer-Weber™

or any other library compatible with NIST format.

Chromatec Navigator

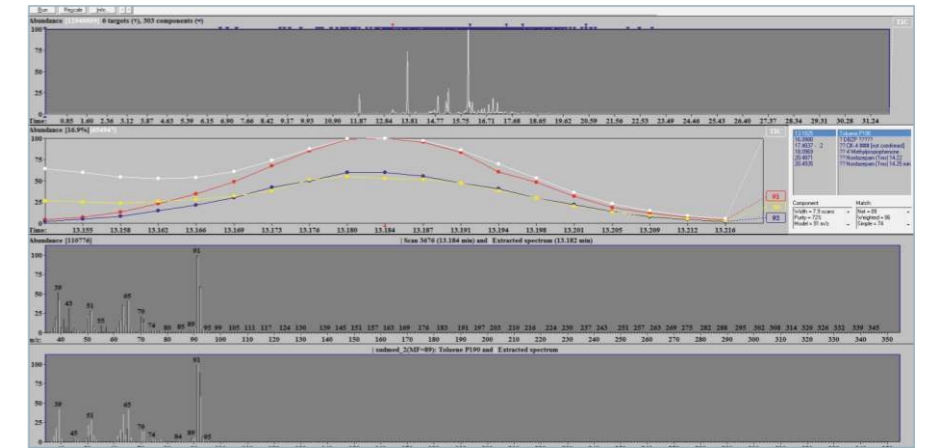
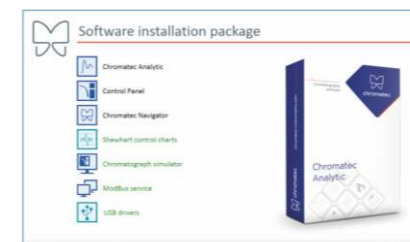
Navigator is an additional application inside the Chromatec Analytic software package.

Navigator is your guide in connection managing, manual or tutorials searching, or support requesting.

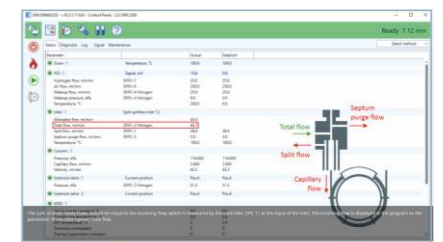
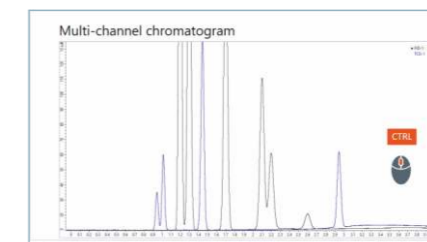
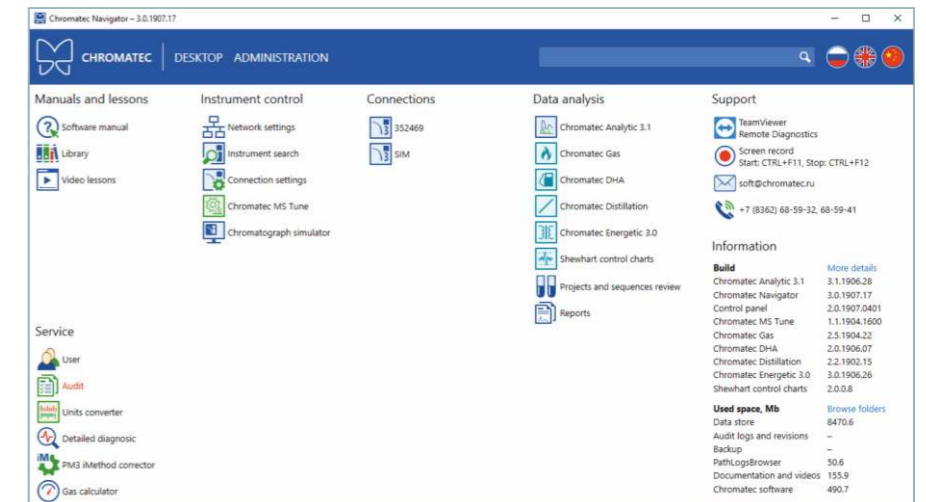
Big Set of Tutorials

Chromatec Interactive training experience expands to a vast set of tutorials built into Chromatec Analytic software, covers GC & GC-MS hardware and software operation and servicing... Beside our effective online learning portal and support.

training course



Fast and flexible manual or automatic searching of mass spectrums in either commonly used libraries or user created ones.



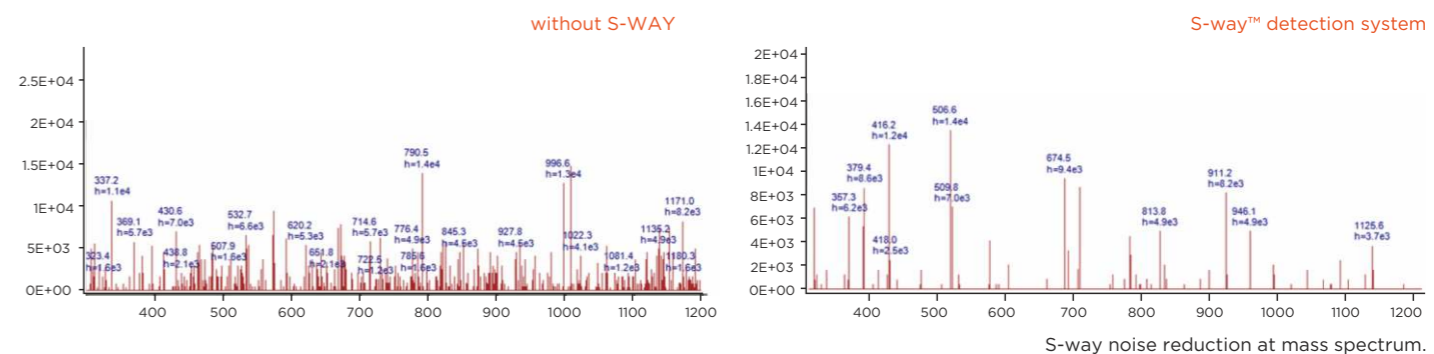
Designed to pass all exams



Software

Chromatec Analytic™ is the powerful tool for instrument control and data processing starting from basic features, like peaks integration and calibration, versatile tools for quantification, report generation, as well as customized features for particular applications and tuning.

read more at pages 6-7

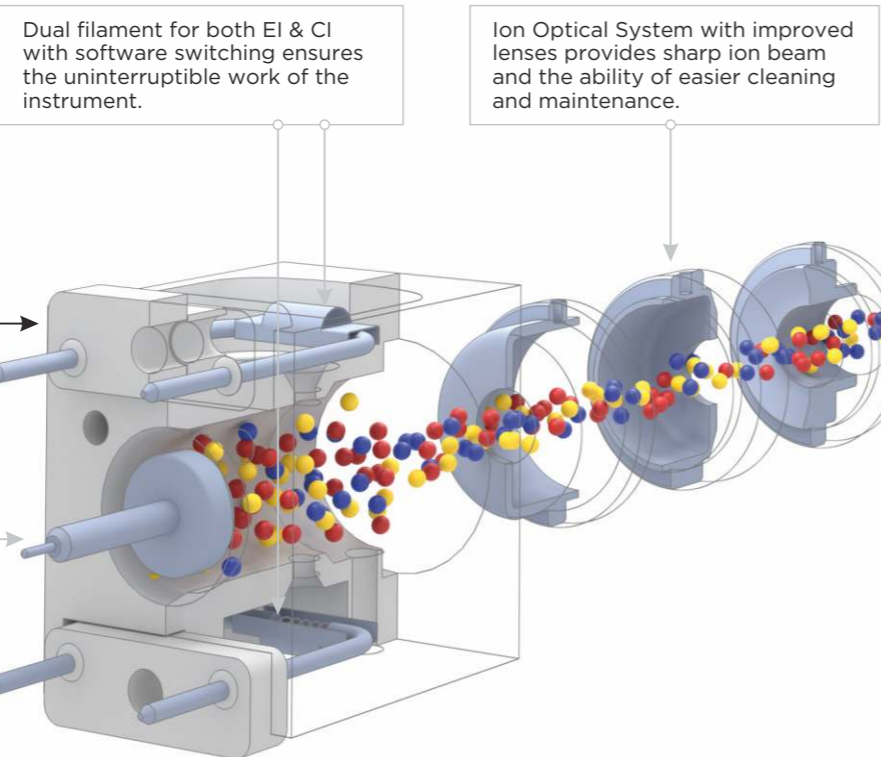


S-way noise reduction at mass spectrum.

Ion source

New Ion Source with ADVIS Technology, has been created by Chromatec engineers to ultimate the efficiency of ionization and to optimize the ion beam focusing, which led to have the highest resistance to the contamination, therefore it minimized the instrument service for smooth and long workflow.

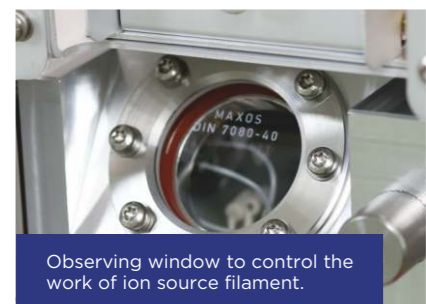
Optional Ion Source STD with special configuration is available for Direct Probe System.



Dual filament for both EI & CI with software switching ensures the uninterrupted work of the instrument.

Ion Optical System with improved lenses provides sharp ion beam and the ability of easier cleaning and maintenance.

The new designed repeller unit along with the updated construction of the ion chamber provide higher ion energy and better ion beam direction with balanced pathing of the targets.



Observing window to control the work of ion source filament.

ALWAYS up-to-date

Any previously installed Chromatec Crystal MSD is upgradable to ADVIS technique with new tune solution unit by ordering a special upgrade kit.

Pumps

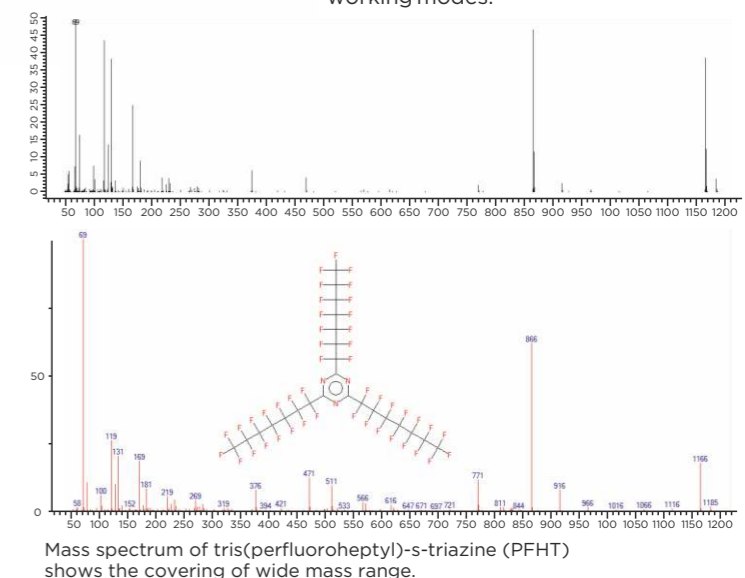
Chromatec mass-spectrometry detector with dual stage vacuum system adopts turbomolecular pumps of highest efficiency with different speeds and mechanical fore vacuum pumps.

Detection System

Implementation of the originally designed S-way™ detection system that based on Off-Axis High Energy Dynode is the result of the higher dynamic range achieving, maximizing ion detection efficiency and twice (at least) reducing the noise of the neutrals.

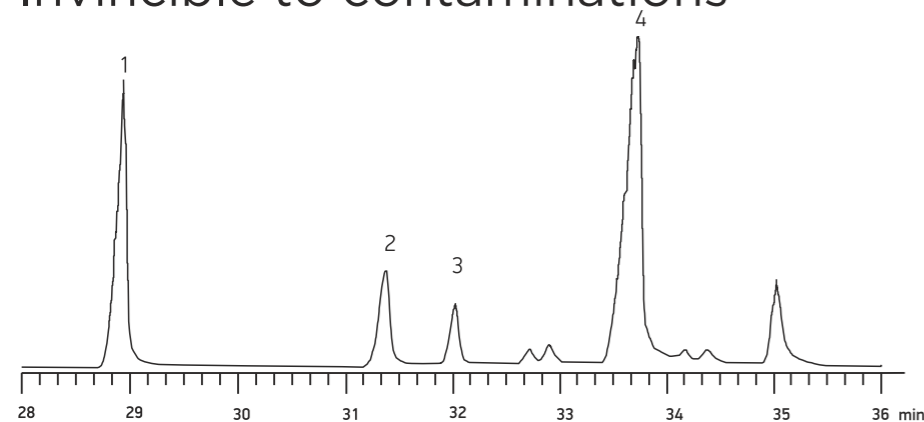
Mass filter

Quadrupole wide-ranged mass filter made from inert materials provides ultra-fast and full scanning, single ion monitoring as well as many different working modes.



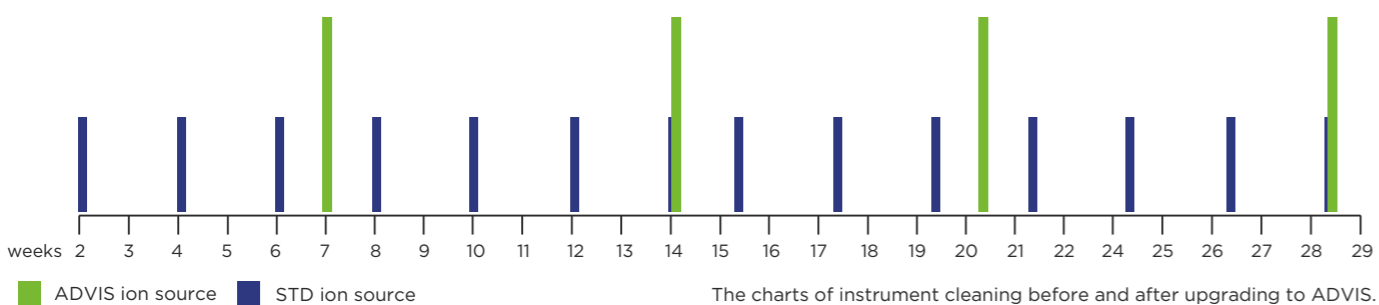
Mass spectrum of tris(perfluoroheptyl)-s-triazine (PFHT) shows the covering of wide mass range.

Invincible to contaminations



Ion Source reinforced by ADVIS technique demonstrates extreme resistance to «dirty» samples such as analysis of fats. Which neutralizes the effect of out-target compounds, consequently the sample preparation becomes easier for many applications like fat quality tests.

Analysis of phytosterols in butter without pre-extraction of fat (Only esterification was applied).
1 – Cholesterol, 2 – Campesterol, 3 – Stigmasterol, 4 – β -Sitosterol



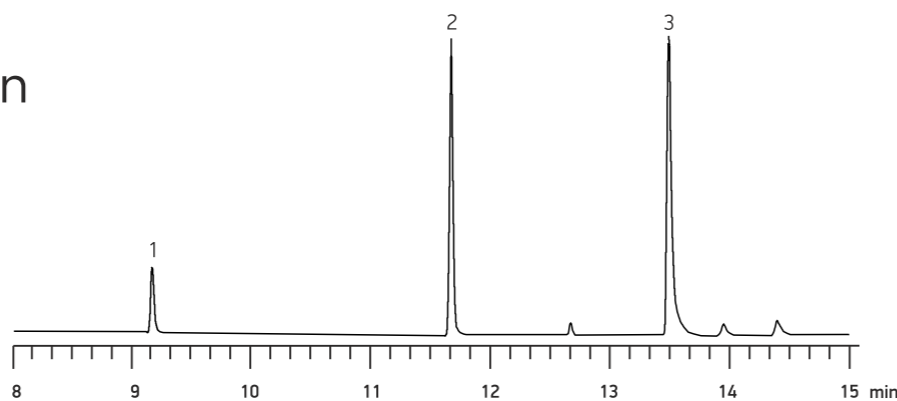
The charts of instrument cleaning before and after upgrading to ADVIS.

Chemical ionization

Chromatec Crystal GC-MS with Chemical Ionization is easy and flexible tool for specific forensic applications where CI is required, such as explosive materials analysis. Chromatec Crystal GC-MS offers high robustness and sensitivity in CI mode.

Crystal GC-MS CI source provides many additional features:

- high accuracy flow control of reagent gases
- two ports for different reagent gases
- double filament for continuous work
- easy & fast switching between EI and CI without vent

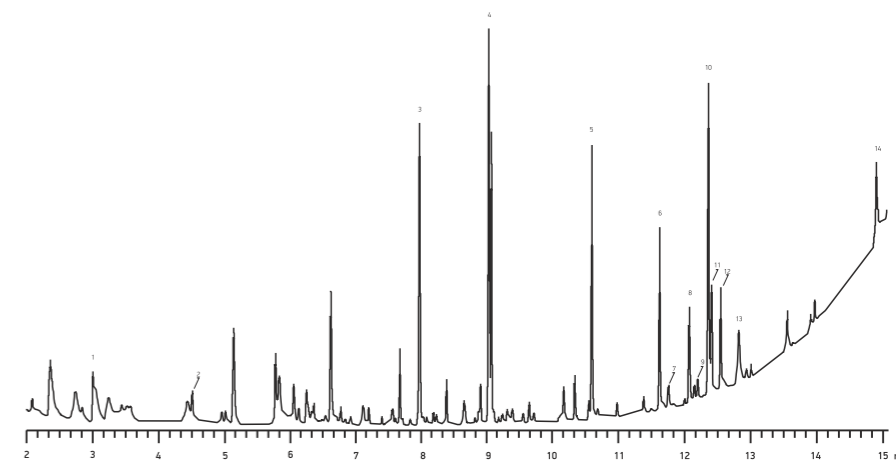


Mix of brizant explosives. Chromatogram and spectra obtained in SIM mode for better selectivity and sensitivity.
1 – Trinitrotoluene (TNT)
2 – Hexogen (RDX)
3 – Pentaerythritol tetranitrate (PETN)



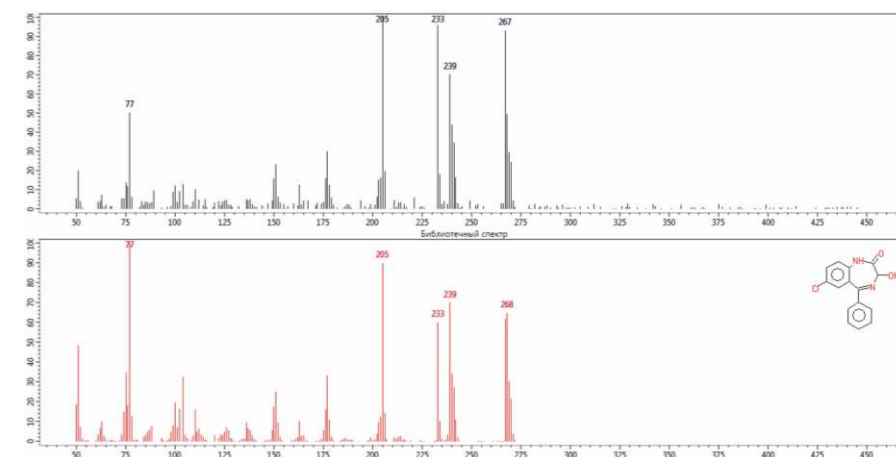
Reliability

Undoubtful confidence and reliability are the main requirements for all forensic applications. Chromatec is ready for this challenge by offering highly sensitive and stable Crystal GC-MS to meet all demands.



1 – Phentermine, 2 – Piperonyl methyl ether, 3 – Meperidine, 4 – Phencyclidine, 5 – Methadone, 6 – Proadifen, 7 – Oxazepam, 8 – Codeine, 9 – Lorazepam, 10 – Diazepam, 11 – Hydrocodone, 12 – Dronabinol, 13 – Oxycodone, 14 – Alprazolam

Chromatogram of drugs of abuse and mass spectra of oxazepam found in NIST17 library

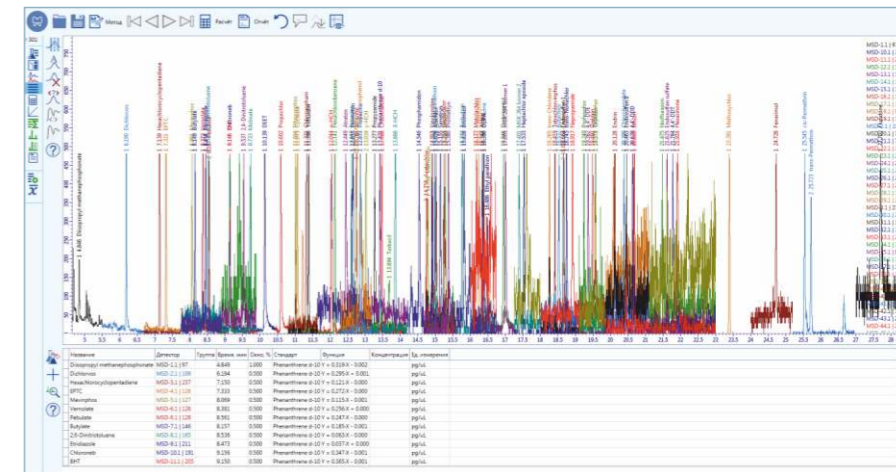


Sensitivity

Chromatec Crystal GC-MS offers high sensitivity for the applications where the level of detection is the essential factor.



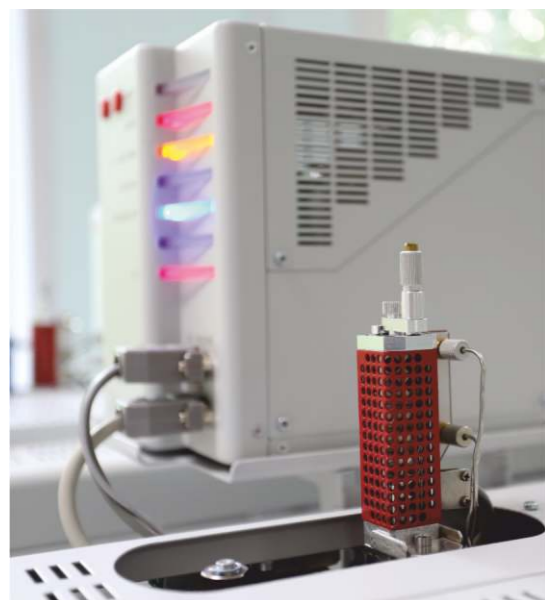
New tuning module with advanced algorithms uses a small amount of tuning solution (PFTBA), which lets to life-time use without refiling..



Pesticides mix 10 ppb

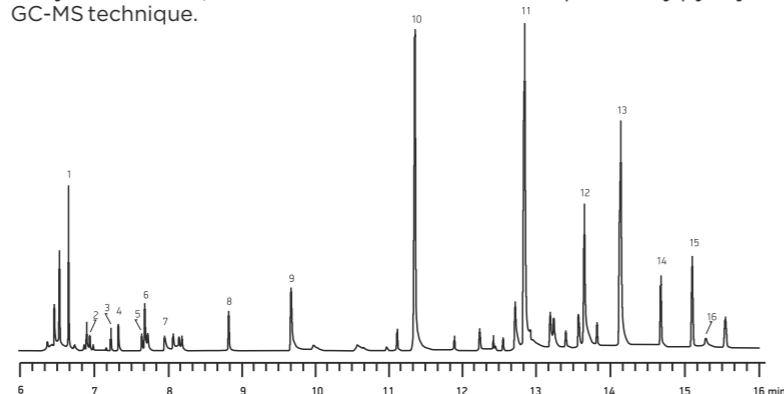
Meet Every Need with Optimal Configuration

Every GC or GC-MS application requires different sample preparation and introduction technique in order to achieve the best result in separation and identification. By offering a broad variety of self-developed sample introduction systems Chromatec helps the analysts to forget about possible limitations in using Crystal GC-MS.



Pyrolysis System

The Solid Sample Pyrolysis System expands the boundaries of traditional GC-MS in the analysis of polymers and other high-molar compounds, as well as in the analysis of volatile substances in solid samples if traditional sample preparation methods are time-consuming or impossible. A new generation of quick-release multifunctional module for pyrolysis in combination with a PTV inlet or cryo-trap is a highly effective tool for the analysis of volatile, low-volatile and non-volatile compounds by pyrolytic GC-MS technique.



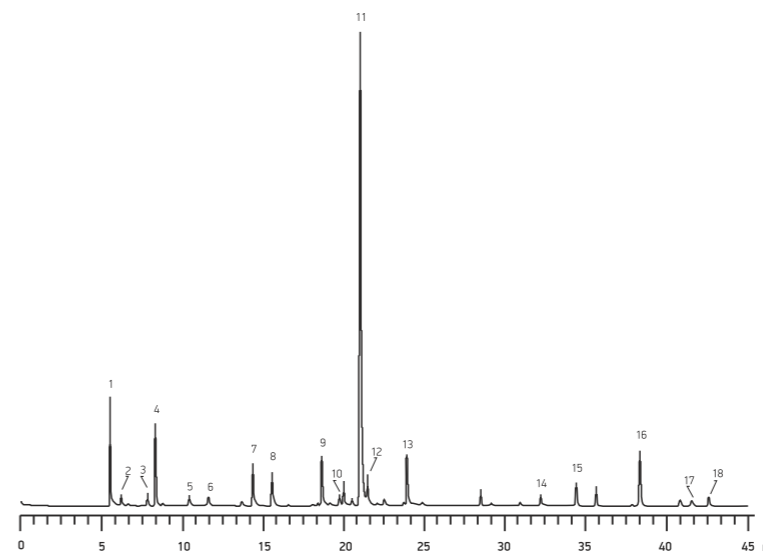
Creating the glycol profile of ink under expert investigation of document prescription.

1 – 2-Propanone, 1-hydroxy-, 2 – 1-Hydroxy-2-butanone, 3 – Furfural, 4 – 2-Furanmethanol, 5 – 2(5H)-Furanone, 6 – Vinyl ether, 7 – Ethanol, 2,2'-oxybis-, 8 – Cyclopropyl carbinol, 9 – Triethylene glycol, 10 – Tetraethylene glycol, 11 – Pentaethylene glycol, 12 – Undecanoic acid, 13 – Hexaethylene glycol, 14 – Benzoic acid, tetradecyl ester, 15 – Benzoic acid, undecyl ester, 16 – Octaethylene glycol

- Liquid Injection
- Headspace
- SPME

Multi-Function autosampler

Chromatec multi-function autosampler AS-2M 3D provides the ability to cover all needs by easy switching among liquid injection mode, headspace mode and SPME. AS-2M 3D provides different injection methods and washing modes, additional to the possibility of injecting to all inlets installed on GC.



Analysis of VOC in waste water by Headspace-SPME technique using Chromatec AS-2M 3D HS autosampler.

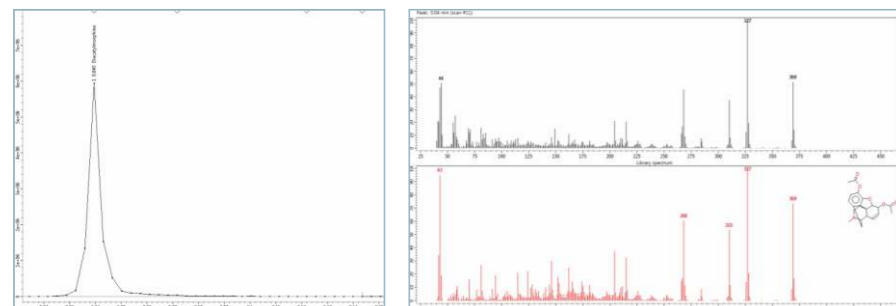
1 – Methanethiol, 2 – Carbon disulfide, 3 – Furan, 4 – Acetone, 5 – Furan, 2-methyl-, 6 – 2-Butanone, 7 – Furan, 2,5-dimethyl-, 8 – 2-Pentanone, 9 – Furan, 2-ethyl-5-methyl-, 10 – 3-Pentanone, 2-methyl-, 11 – Disulfide, dimethyl, 12 – Hexanal, 13 – 4-Heptanone, 14 – p-Cymene, 15 – 2-Methoxythiophene, 16 – Dimethyl trisulfide, 17 – Acetic acid, 18 – 2-Ethyl-1-hexanol



Direct Probe System

Chromatec DPS solutions provide direct introduction of samples into MSD without pre-separations in GC. Chromatec developed high-end DPS solution with unique benefits:

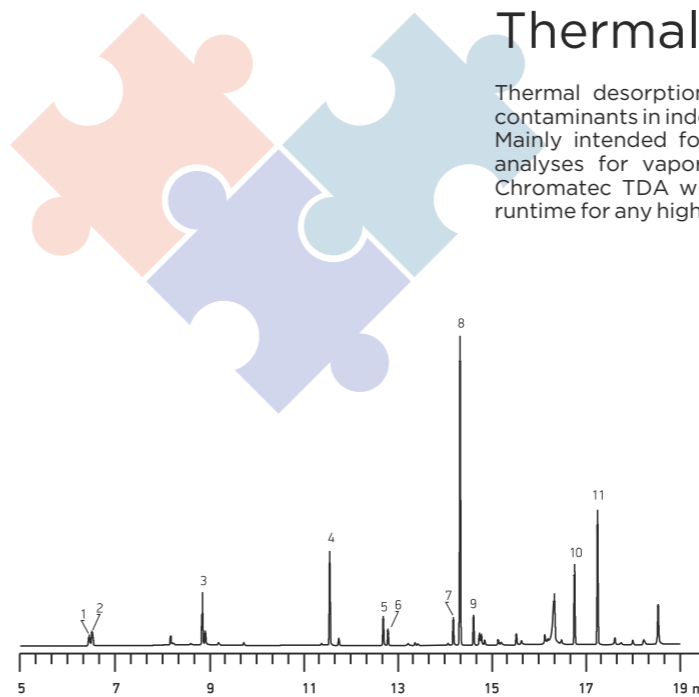
- Samples are introduced directly in the Ionization Chamber for increasing the sensitivity and the analysis speed
- Minimized heating element for smooth and fast heating of samples
- Two types of sample introduction: DIP (Direct Insertion Probe) and DEP (Direct Exposure Probe)
- Switching between EI and CI modes without venting the MSD



DIP analysis is used by special services when normal GC sample preparation is not available. Example is the peak and associated spectrum of diacetylmorphine obtained from suspicious substance.

Thermal Desorption Analysis

Thermal desorption system Chromatec TDA has the ability to measure volatile contaminants in indoor and outdoor air, polymers, building materials and others. Mainly intended for environmental testing and research, it also provides unique analyses for vapor emission testing in forensic and defense applications. The Chromatec TDA with 50-tubes automatic loader ensures 24-hour uninterrupted runtime for any high throughput laboratory.



Analysis of flavor and fragrance components of soap

1 – Hexanal, 2 – Butanoic acid ethyl ester, 3 – Butanoic acid 2-methyl-, 1-methylethyl ester, 4 – Acetic acid hexyl ester, 5 – 7-Octen-2-ol, 2,6-dimethyl-, 6 – Hexanoic acid, 2-propenyl ester, 7 – Acetic acid, phenylmethyl ester, 8 – 3,5,5-Trimethylhexyl acetate, 9 – Benzenemethanol, α-methyl, acetate, 10 – 4-tert-Butylcyclohexyl acetate, 11 – Cyclohexanol, 4-(1,1-dimethylethyl)-

