C10G-E067A

SHIMADZU
Excellence in Science

Analytical and Testing Instruments for the HPI Market

Shimadzu's Total Solutions for the Hydrocarbon Processing Industry

World Map of Shimadzu Sales, Service, Manufacturing, and R&D Facilities

Shimadzu's Total Solutions for the Hydrocarbon Processing Industry (Petrochemical, Chemical)

The Hydrocarbon Processing Industry (HPI), encompassing petroleum refining, gas processing, petrochemical and chemical, is a foundational field for all industry. In the HPI market, many kinds of analytical and measuring instruments are used for quality control purposes and process management.

With a wide range of products, from GC and Elemental Analyzers to an On-line Water Quality Analyzer, Shimadzu offers total support for laboratories in the HPI market.

From Upstream to Downstream, our rugged, high-quality products are perfectly suited to meet the demands of your laboratory and contribute to your business success.

Upstream

Developing, Extracting

Exploration, Finding

Transporting, Storage

Manufacturing, Refining

Supply, Trading

Downstream

For more information about Shimadzu's solutions for the HPI market, visit our website at:
https://www.shimadzu.com/an/industry/petrochemicalchemical/index.html

Shimadzu Customized GC Analyzers

Various Applications in the HPI Market

- Support third-party detectors, including a pulsed flame photometric detector (PFPD) and a pulsed discharge helium ionization detector (PDHID).
- Support third-party software for detailed hydrocarbon analysis (DHA) and Chrom Merge.
- Support liquefied petroleum gas (LPG) sampling devices and vaporizers.
- Complete application manual and methods

Nexis GC-2030

Product Lineup

	Natural Gas Analyzers	Refinery Gas Analyzer (RGA)	Process and Custom Gas Analyzers	TOGA/DGA Analyzer	Petrochemicals analyzer
Applicable Methods	ASTM D1945/D1946 GPA 2261, GPA 2177 GPA 2286, GPA 2186 ISO 6975	UOP 539, ASTM D7833, D 2163	ASTM D1946 ASTM E1746	ASTM D3612C	ASTM D6228
Analysis	C1-C6+ Hydrocarbons, Non Condensable gases O2, N2, CO, CO2 and H2S Optional Hydrogen Extended NGA C1-C14+ NGL, Dual Oven NGA High Speed NGA	C1-C6+ Hydrocarbons saturates and unsaturates H2S, Non Condensable gases O2, N2, CO, CO2 and H2 LPG Sampling Vaporizer	O2, N2, CO, CO2 Impurities in Chlorine	TOGA with Head Space H2, O2, N2, CO, CO2, C1, C2's, C3's	Trace Sulfur
Features	Analysis time 10 min.	Analysis time less than 6 min.	Special Hastelloy Material for Chlorine Analyzer	High Sensitivity Extension up to C4	PFPD for Sulfur

Transformer Oil Gas Analyzer (TOGA)

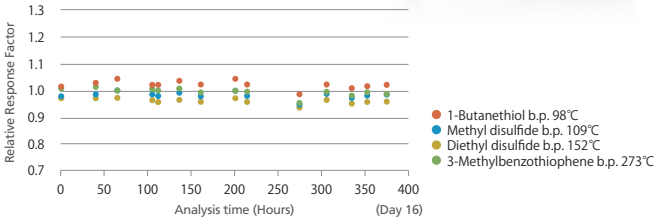
Simulated Distillation Analyzer

Trace Sulfur Analysis GC System

Sulfur Chemiluminescence Detection Gas Chromatograph System

Nexis SCD-2030

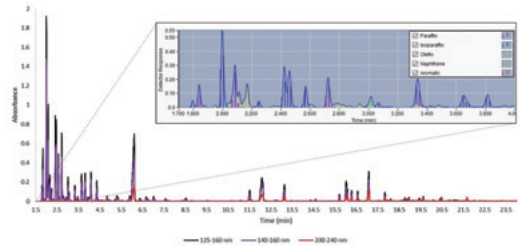
- Best-in-Class Sensitivity
- Unmatched Stability performance
- Excellent Maintainability
- Automation Functions



Excellent Long-Term Stability

VUV PIONA+ Analysis GC System

- Comprehensive gasoline measurements determining bulk PIONA and specific oxygenate and BTEX compound content.
- Provides a lot of information in a fast, robust measurement.
- Relatively simple instrumentation, setup, and analysis procedures.



VUV Chromatogram of Gasoline Sample

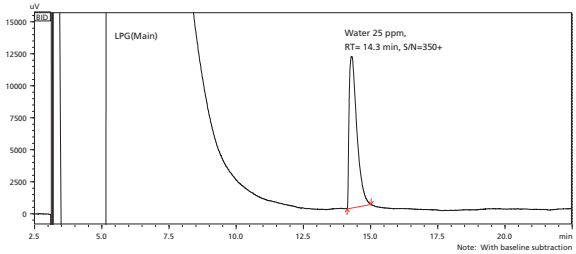
* The VUV detector VGA-100 is a product of VUV ANALYTICS, INC.

VUV ANALYTICS

Simulated Distillation	DHA Analyzers	Oxygenates Analyzers	Sulfur Analyzers	Aromatics Analyzers
ASTM D7096, D7213, D3710, D2887, D6417, D6352, D7500, D5307, D7169, IP 480, ISO3924	ASTM D5134, D6729, D6730, D6733, D8071	ASTM D4815,D7423 UOP 960	ASTM D6228 ASTM D5504 ASTM D5623 ASTM D7011	ASTM D3606, 5580
Boiling Point Distribution C1-C110 (As per method)	C1-C14 Hydrocarbons PIONA Report	C1-C4 Alcohols	Trace Sulfur Analysis Individual components	Aromatics
Fast Simdist Correlations with D86 and D1160, Integrated Shimadzu Software	Tuned D6730 column Fast DHA Front End PIONA Room Temperature Database VUV PIONA+	Use of N2 Carrier for D4815	Use of FPD, PFPD or SCD Detectors	Combination model for D3606, D5580. D4815

Trace Moisture Analysis GC System

- Easily analyzes both liquid and gas samples
- Uses a variety of Watercol™ GC columns depending on the matrices
- Uses a simple, high-sensitivity, and very stable low-cost Barrier Ionization Discharge (BID) Detector



Analysis of Water in LPG

Shimadzu's Total Solutions for the Hydrocarbon Processing Industry

Aromatics Analysis HPLC

Features

- Switching Valve Configuration
- Super Performance and Expandability
- Precise Sample Injection

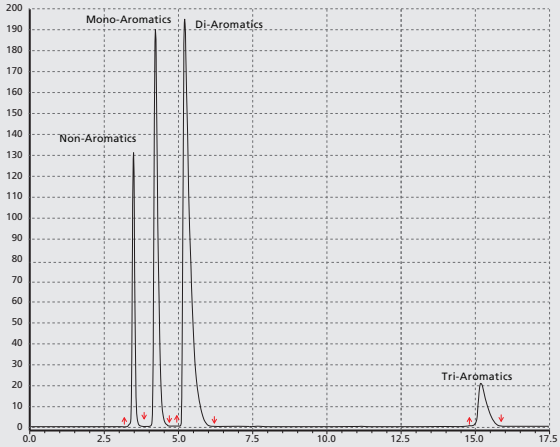
Applicable Methods

ASTM D 6591, D6379, IP 391, IP 436,
IP 548, IP590 Custom Methods

Analysis Subjects

Aromatics in fuels

Poly-aromatics in diesel
FAME in jet fuel



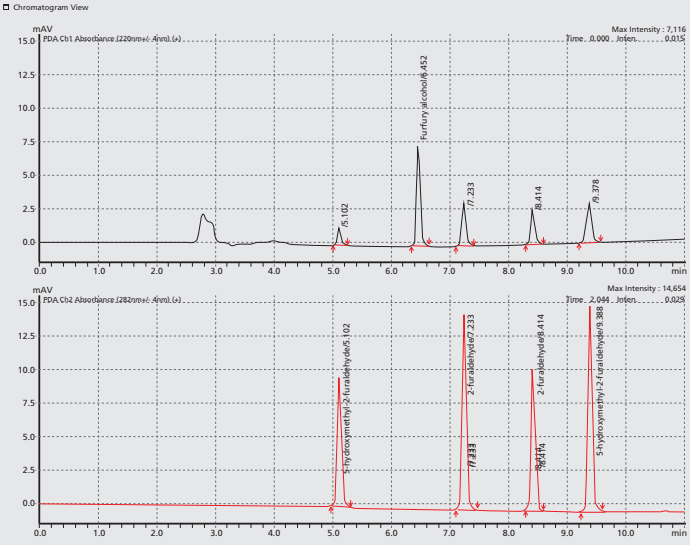
Aromatics Ref. Std. ASTMD6591

Applicable Methods

ASTM D5837
Custom Methods

Analysis Subjects

Components in transformer oil



Furan Chromatogram

Furan Analysis HPLC

Features

- Fully Integrated System
- Network Connectivity
- High Sensitivity Detector

LC / MS / MS

LCMS-8060

Features

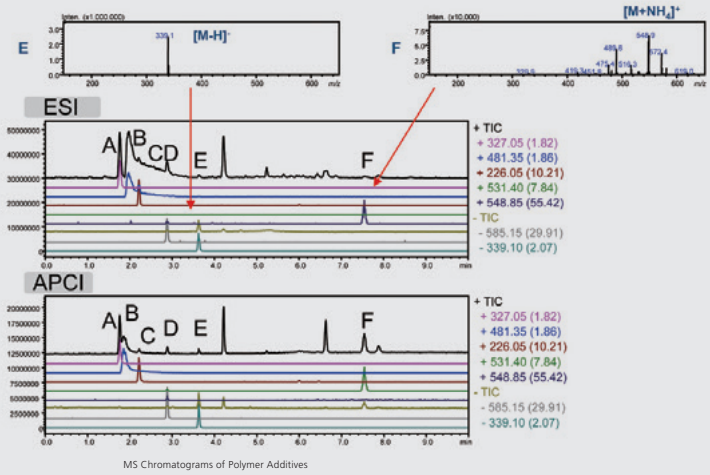
- High Speed and High Sensitivity
- Scan Speed 30000u / sec
- MRM 555 Ch / Sec

Applicable Methods

Custom Methods

Analysis Subjects

Additives in polymers



MS Chromatograms of Polymer Additives

Analysis of Additives in Plastic

Applicable Methods

EPA 8270B, TO -14, IP-585

Custom Methods

Analysis Subjects

Volatile organic compounds

Arsine phosphine in ethylene

FAME in jet fuel

HS-20 Headspace Analysis System

TD-30 Thermal Desorption System

VOCs Analysis GC-MS

GCMS-QP2020 NX

Features

- Accessories HS, TD and P&T
- High Sensitivity and Reduced Cost
- High Efficiency Multicomponent Analysis

Inductively Coupled Plasma Mass Spectrometer (ICP-MS)

Features

- Easy Method Development
- Lowest Running Costs
- High Stability, High Sensitivity and Low Interference

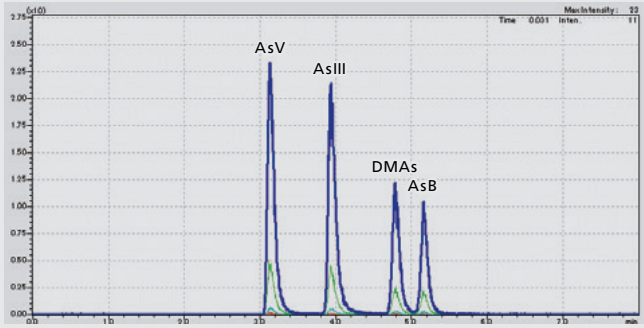
Applicable Methods

Customized

Analysis Subjects

Trace elements in naphtha

Determination of toxic arsenic species using LC-ICP-MS



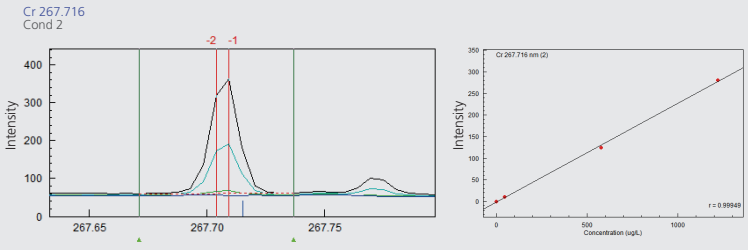
Arsenic Chromatogram

Applicable Methods

Elemental Analysis ASTM D4951, D5184
ASTM D4951,D5184 UOP 389, UOP 303
UOP 714, APHA 3120, IFP 9507

Analysis Subjects

All elements
Lubricating oils
Petroleum naphtha, gasoline
Marine fuel, fuel oil, heavy oils



Cr in Naphtha with ISO Mist Kit

ICP Atomic Emission Spectrometer (ICPE)

ICPE-9800 Series

Features

- Easy Method Development
- Low Argon Consumption
- All Wavelength Acquisition

Atomic Absorption Spectrophotometer (AAS)

AA-7000

Features

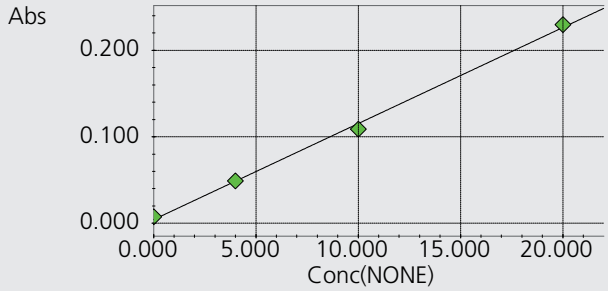
- Unique 3D Double Beam Optics
- Comprehensive Safety Functions
- Dual Background Correction Functions

Applicable Methods

ASTM D6595, D3237, D3567, D3605, D3635, D3831, D3919, D4628, IFP9312, UOP946, D5863

Analysis Subjects

Additives in polymers
All elements
Lubricating oil
Petroleum oils
Lead in gasoline



Abs=0.011100Conc+0.0043463 r=0.9989

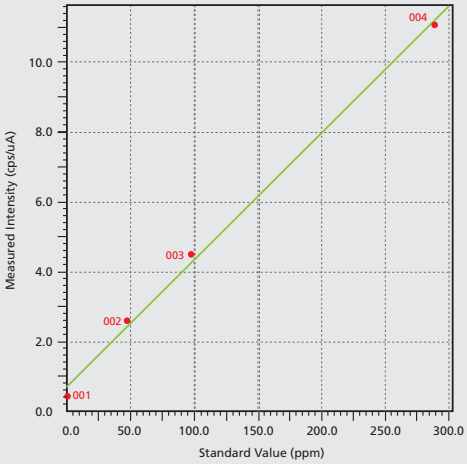
Arsenic in Vacuum Gas Oil (VGO)

Applicable Methods

ASTM D5839, ASTM D4294, C114
ISO 8754

Analysis Subjects

Sulfur in oil
All elements



Zn in Lubricant Oil

Energy Dispersive X-ray Fluorescence Spectrometer (EDX)

EDX-7000/8000/8100

Features

- High Sensitivity, High Speed and High Resolution
- Large Sample Chamber
- Easy-To-Use Operation

Shimadzu's Total Solutions for the Hydrocarbon Processing Industry

Fourier Transform Infrared Spectrophotometer (FTIR)

IRSpirit

Features

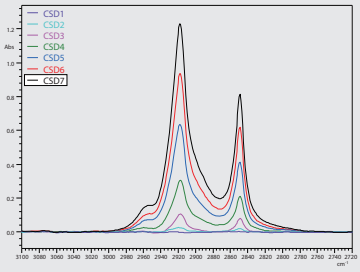
- Space Efficient with High Expandability
- Dedicated IR Pilot Program
- High Reliability

Applicable Methods

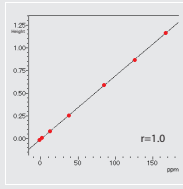
D7371, EN 14078, D7575, D7678
Custom Methods

Analysis Subjects

Fame in biodiesel
Total petroleum hydrocarbons
Additives in polymers
Oil in water



Enlarged View of Peaks Around 2920 cm^{-1}



Sample	Absorbance	Concentration [ppm]
CSD1	0.0020	0.73
CSD2	0.026	4.54
CSD3	0.096	15.23
CSD4	0.28	40.56
CSD5	0.60	87.57
CSD6	0.87	127.55
CSD7	1.2	168.70

Calibration Curve and Standard Sample Concentrations

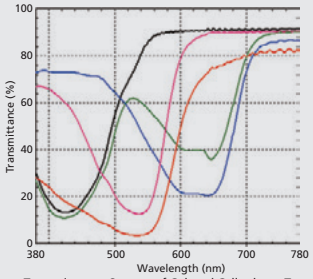
Analysis of Oil in Water

Applicable Methods

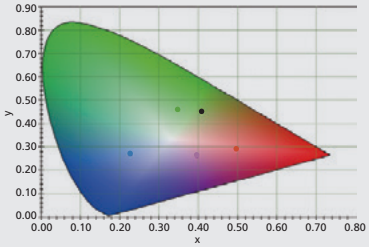
ASTM D1840, D2008
Custom Methods

Analysis Subjects

Petroleum products
Turbine fuels
Mineral oils



Transmittance Spectra of Colored Cellophane Tape



Chromaticity Diagram of XY Color System

Analysis of Colored Cellophane Tape

UV-VIS Spectrophotometer (UV-Vis)

UV-1900

Features

- Easy Operation Allows Obtaining Answers Rapidly
- Advanced Regulatory Compliance
- High Performance to Meet Diverse Needs

Thermal Analyzers

DSC-60 Plus

Features

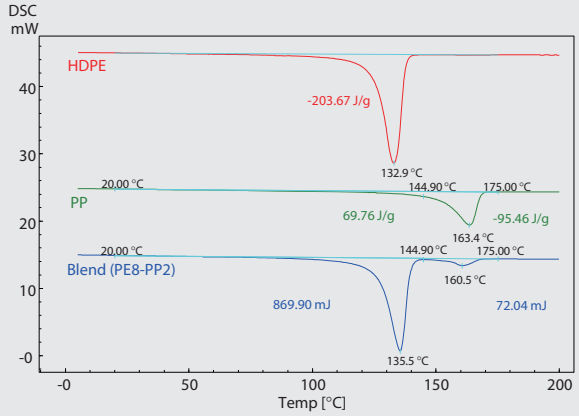
- High Performance DSC / TGA
- Diverse Measurements by Simple Operations
- High Sensitivity

Applicable Methods

ASTM D3417, D3418, D4419, D4591, D5483,
ASTM D3850, D6370, D6375,
Custom Methods

Analysis Subjects

Thermal properties of polymers
DSC, TGA, TG/DTA, TMA



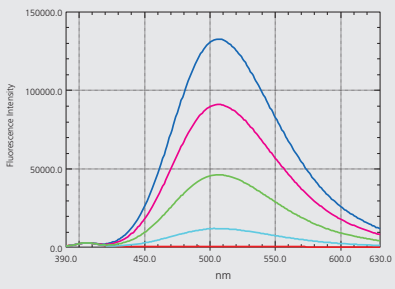
DSC Curves of HDPE, PP, and Blend Sample

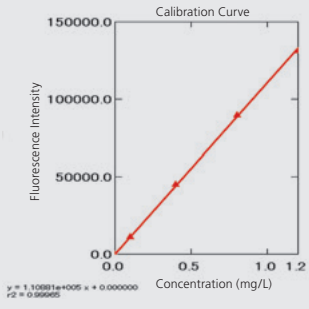
Applicable Methods

ASTM D5412, JPI-5S-71-2010
Custom Methods

Analysis Subjects

Measuring oil in water
Coumarin in diesel





Coumarin in Diesel

Spectrofluorophotometer

RF-6000

Features

- High Sensitivity High Stability and High Speed
- High Speed 3D Scanning
- Fluorescence Quantum Yield and Fluorescence Quantum Efficiency Measurement

Total Organic Carbon (TOC) Analyzer

TOC-L Series

Features

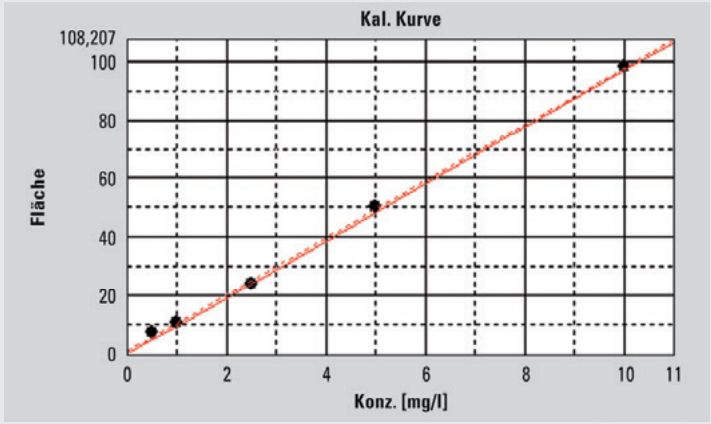
- 680 DegC Combustion Method
- High Salt Kit
- Standalone System

Applicable Methods

ASTM D7573, EN 1484, EPA 415.1
APHA 5310B

Analysis Subjects

TOC in various types of water, including high salt content water



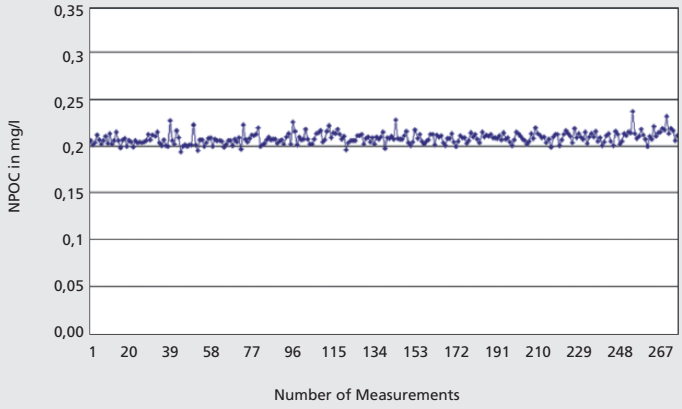
TOC in Brine Solution

Applicable Methods

Custom Methods

Analysis Subjects

TOC in various types of water



TOC Analysis in Condensate Sample
Mean Value 0.208mg/L, SD 0.006mg/L, DL 0.05mg/L

On-line TOC Analyzer

Features

- Superior Sampling Units
- Low Operation Costs
- Low Maintenance Costs

Testing Machines

AG-Xplus Series

Features

- Short Test Cycle Time
- Ultrafast Sampling Rate
- Eight Fold High Resolution

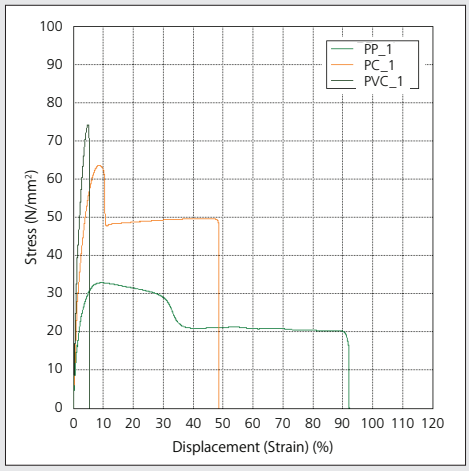
Applicable Methods

ISO 6892, ISO 527, ASTM D638

Analysis Subjects

Tensile properties of metals

Tensile properties of plastics



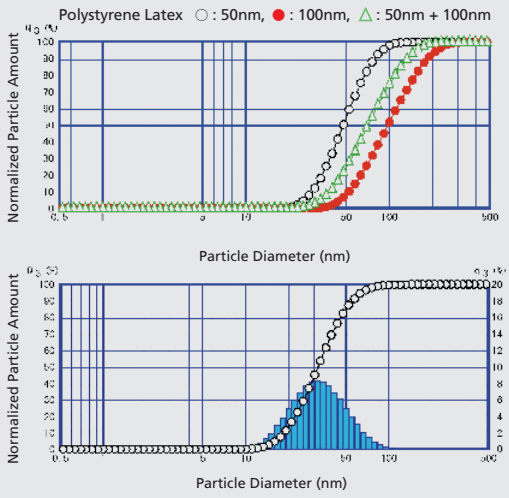
Tensile Test of PP, PC, PVC

Applicable Methods

Custom Methods

Analysis Subjects

Various petrochemicals streams



Samples with Broad Distribution

Particle Size Analyzer

SALD-2300

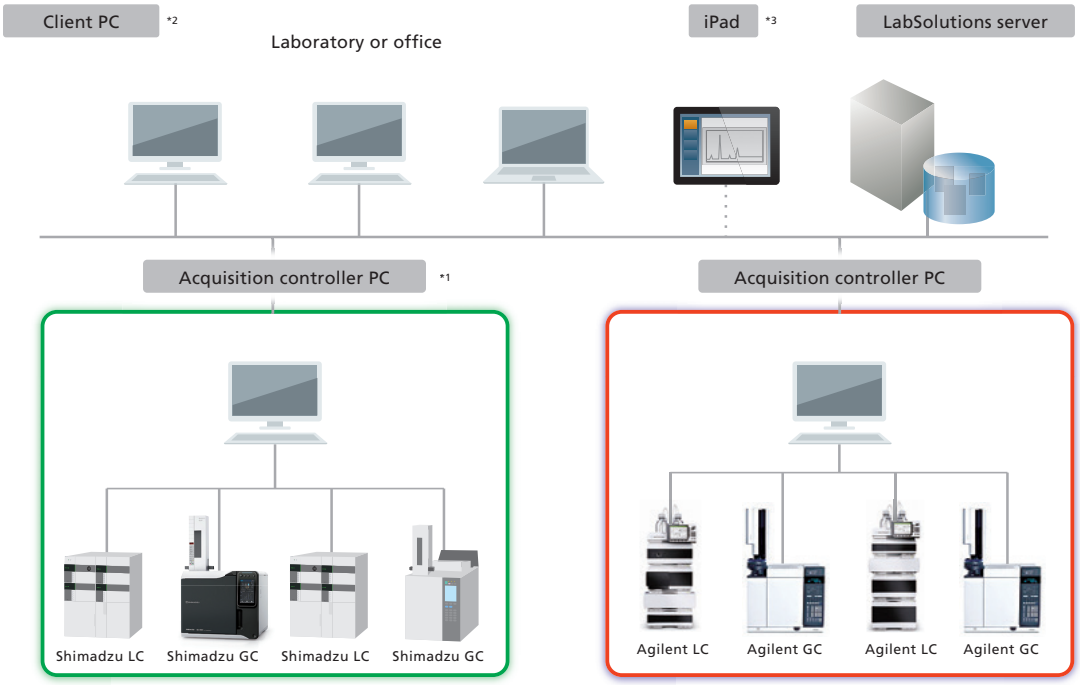
Features

- Wide Range 17nm-2500um
- Wide Range of Accessories
- High Sensitivity / High Concentration

Shimadzu Analytical Network Data System

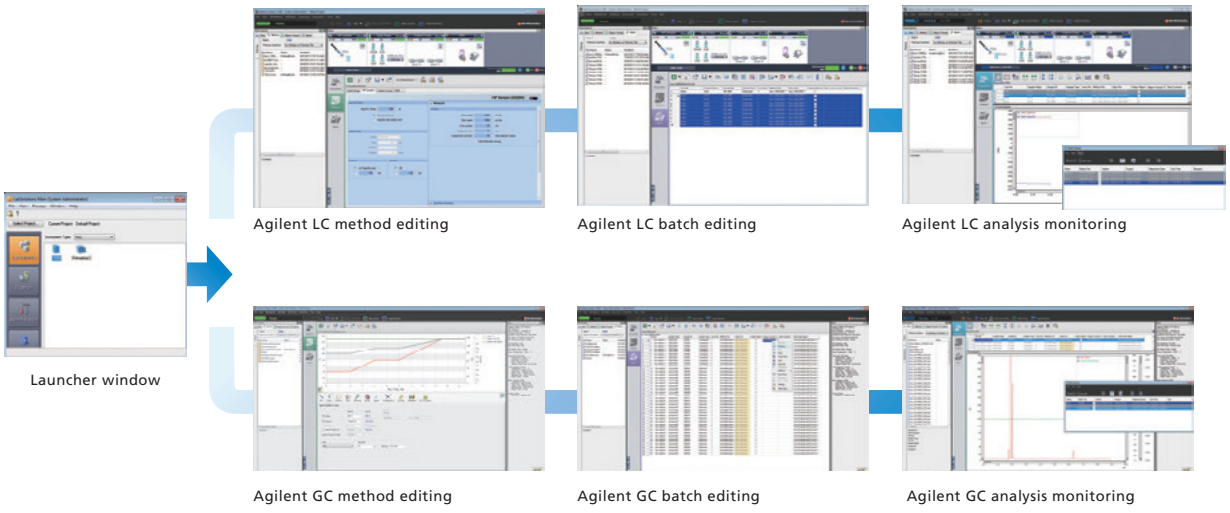
LabSolutions CS

Controlling other vendor's GC and HPLC using LabSolutions DB/CS



*1 The acquisition controller PC controls the analytical instruments.
Analysis directions and re-analysis of data can be performed using a client PC.
*2 It is not necessary to install LabSolutions software on the client PC for terminal service.
*3 When using an iPad, the installation of Citrix's XenApp is required. iPad is a registered trademark of Apple Inc.

Simple User Interface



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Sulfur Chemiluminescence Detection Gas Chromatograph System

Nexis SCD-2030

The Next Industry Standard SCD

The Nexis SCD-2030 is a next-generation sulfur chemiluminescence detection system.
It has been developed to fulfill the unmet needs of laboratories the world over.
The dramatically enhanced sensitivity and reliability, the excellent maintainability,
and the automation functions, a first for the industry, will improve laboratory productivity.

- The New Standard in Reliability
- Dramatically Improved Productivity
- Best-in-Class Sensitivity

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