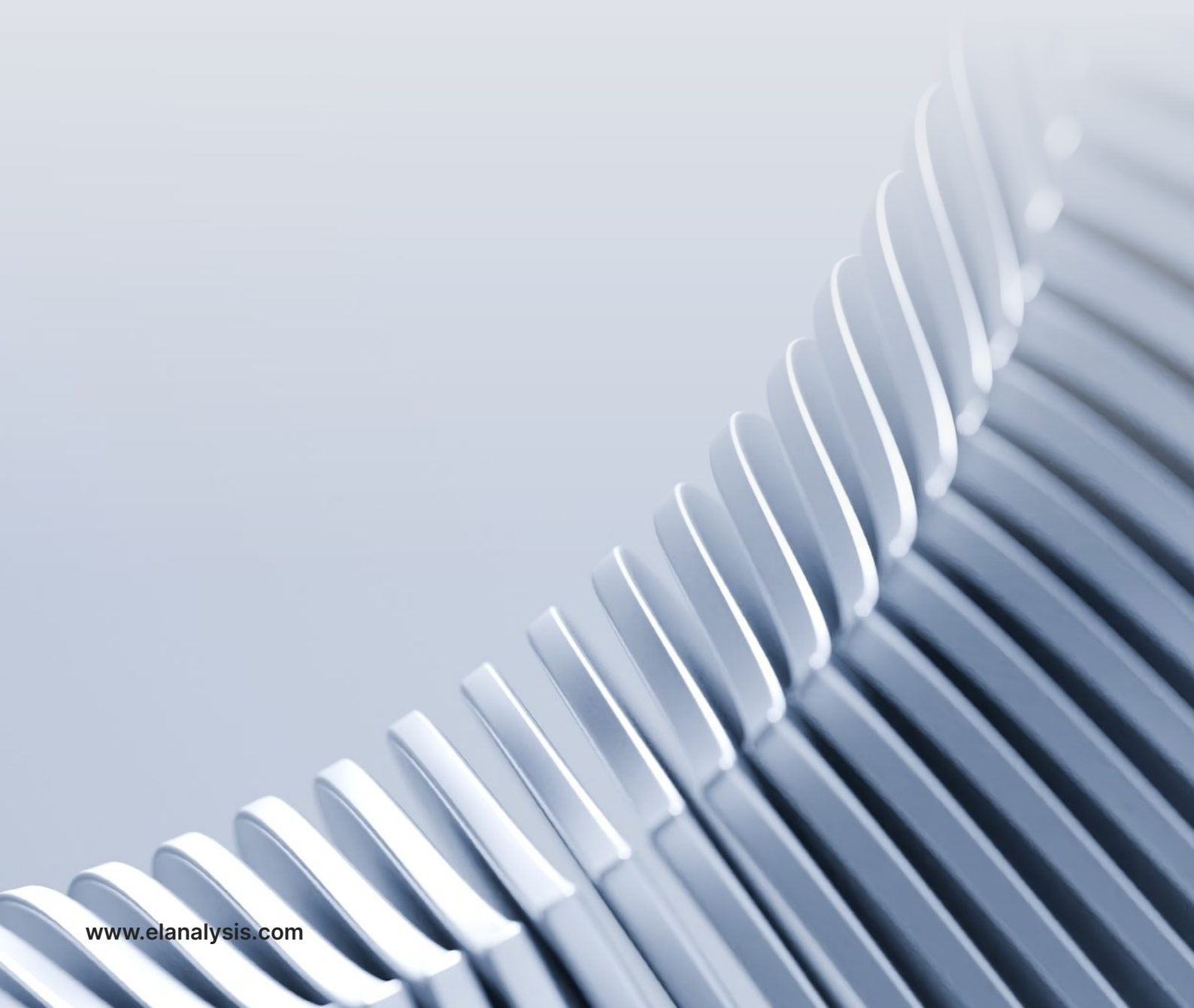
el expand your limits

Smarter Process, Perfect Yield.

Guide to Integrated Systems for High-Precision Gas Analysis and Real-Time Process Monitoring



www.elanalysis.com

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Introduction.



For over 20 years, we have measured what others couldn't. Invisible gases. Trace concentrations. The chemistry happening inside a sealed OLED cell or a plasma process chamber at 2,000 scans per second. From gas analysis to real-time process monitoring — we build the instruments and deliver the data that keeps the world's most advanced manufacturing running.

We focus on our limits.

Who We Are

Founded in 2004, we have grown from a specialist in low-vacuum ultra-trace gas analysis into a trusted partner for Korea's leading semiconductor and display manufacturers, as well as global foundries in Singapore and Taiwan.

What We Do

Built on more than two decades of gas analysis expertise, we provide integrated solutions spanning GHG efficiency measurement, process chamber monitoring, custom gas analysis, and vacuum consulting to help customers improve productivity and manufacturing insight.

Where We Are Going

Looking ahead, we are expanding its global footprint across Asia while pursuing its vision of becoming a leading material quantity measurement research company focused on innovation, customer satisfaction, and sustainable growth.

Products.



iquad



iquad-s



icomby



itof



ioes

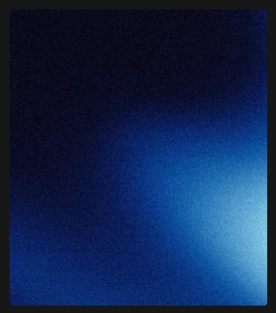


imerge

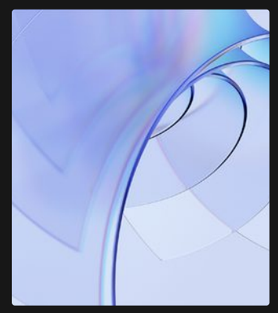


ivacuum

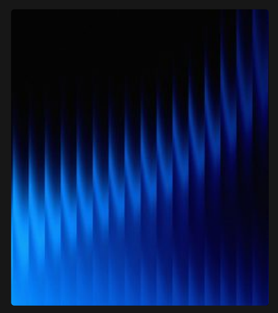
Services.



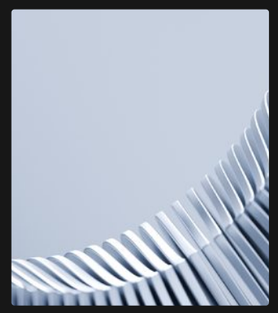
GHG measurement & Consulting



Process Chamber Monitoring



Gas analysis & Sampling



Vacuum Consulting

Product

iquad.

Low-Vacuum General-Purpose Gas Analysis System

iquad (formerly isepa) is our stationary, laboratory-grade QMS gas analysis system. It simultaneously identifies and quantifies multiple gas species — including O_2, N_2, H_2, Ar, SF_6, CF_4, NF_3, and others — using a Quadrupole Mass Spectrometer operating in the low-vacuum range. The fully automated software minimizes human intervention, reducing measurement error and enabling consistent, high-quality analytical results. Batch-type inlet design allows collected samples to be analyzed with high repeatability.



Key Features

01

Fully Automated SW

our proprietary automation software handles calibration, measurement, and result output without manual steps — reducing operator error and delivering consistent data quality across all users.

02

Multi-Component Simultaneous

A single measurement cycle identifies and quantifies all gas species present in the sample — no sequential scanning required. Detection limit: 5 ppm ±3% (at N_2), 1 amu resolution.

03

Wide Mass Range

Standard mass range 0–200 amu (expandable to 1–500 amu). Covers light gases (H_2, He) through heavy species (SF_6, Xe), with both Faraday Cup and Secondary Electron Multiplier detectors.

System Overview

Model / Principle	iquad / QMS (Quadrupole Mass Spectrometry)
Detector	Faraday Cup & Secondary Electron Multiplier
Filament	Yttriated Iridium or Tungsten
Inlet Type	Batch type (volume diffusion method)
Mass Filter	1 ea

Performance

Mass Range	0–200 amu (Max. 1–500 amu)
Detection Limit	5 ppm ±3% (at N_2)
Resolution	1 amu
Measurable Gases	H_2, CH_4, CO, CO_2, N_2, O_2, He, Ne, Ar, Xe, Kr, SF_6, CF_4, NF_3, etc.

System Configuration

OS / Control	Windows 10 / Touch screen · Auto & manual control program
Main Power	AC 220V, 12.5A, 50/60 Hz, Single-phase
Operating Temp.	RT ~ 40°C
Humidity	0–80% (non-condensing)

Installation Requirements

Dimensions (W×D×H)	950 × 780 × 1,500 mm
Weight	200 kg
Min. Operating Space	1,100 × 1,400 × 1,800 mm
Utilities	Air compressor (5–8 kgf/cm²) & N_2 standard gas

* Product design and specifications may change without prior notice per customer requirements.

Product

iquad-s

Field-Deployable QMS for Real-Time Gas Analysis

iquad-s is a field-deployable QMS system designed for direct, real-time gas measurement at the process point. Unlike laboratory-based analysis, it operates without a separate sampling step, making it ideal for environments where sample collection is difficult or impractical. Volumetric flow rate is calculated using Kr tracer gas concentration, enabling accurate process monitoring. The system is widely deployed for GHG reduction facility efficiency measurement and has been supplied to Samsung Electronics, GST, Ecopro, and other leading industrial facilities.



Key Features

01

Direct Real-Time Injection

Gas is injected directly into the analyzer without a prior sampling step. Ideal for on-site measurement where sample collection is difficult — such as process exhausts and tight-space environments.

02

Kr-Based Flow Rate Calculation

Total volumetric flow rate is calculated by measuring the concentration of monoatomic Kr tracer gas — a capability unique to QMS that is not achievable with FTIR systems.

03

Compact & Portable

At 471×195×260 mm and 15 kg, iquad-s is engineered for field use. Module-type inlet system and LAN/RS-232-C communication enable flexible integration into existing measurement setups.

System Overview

Model / Principle	iquad-s / QMS (Quadrupole Mass Spectrometry)
Detector	Faraday Cup & Secondary Electron Multiplier
Filament	Yttriated Iridium or Tungsten
Inlet Type	Module type inlet system

Performance

Mass Range	0–200 amu (Max. 1–500 amu)
Detection Limit	5 ppm ±3% (at N_2)
Resolution	1 amu
Min. Detec-tion Partial Pressure	2×10^{-12} mbar
Sensitivity	6×10^{-4} A/mbar (for Ar)
Measurable Gases	H_2, CH_4, CO, CO_2, N_2, O_2, He, Ne, Ar, Xe, Kr, SF_6, CF_4, NF_3, etc.

System Configuration

Main Power	AC 220V, 12.5A, 50/60 Hz, Sin-gle-phase
Operating Temp.	RT ~ 40°C
Humidity	0–80% (non-condensing)
Communica-tion	RS-232-C / LAN
Output	iquad-s software

Installation Requirements

Dimensions (W×D×H)	471 × 195 × 260 mm
Weight	15 kg

* Product design and specifications may change without prior notice per customer requirements.

Product

icomby

Integrated QMS & FTIR System for GHG Monitoring

icomby integrates QMS and FTIR into a single calibrated system, enabling synchronized measurement of gas concentration and volumetric flow rate. By eliminating inter-system mismatch and timing uncertainty, it delivers accurate efficiency calculations and real-time emission data through a unified software interface.



Key Features

01

Integrated QMS + FTIR

A single system measures both concentration (FTIR) and volumetric flow rate (QMS) in synchronized fashion — eliminating the calibration mismatch and timing errors inherent in two separate instruments.

02

Real-Time Emission Output

GHG emission rate is calculated and displayed in real time. At the moment measurement ends, complete emission data is immediately available — no post-processing delay.

03

Reduced Measurement Uncertainty

Unified architecture and shared calibration reference reduce overall measurement uncertainty compared to separate-instrument configurations. Supports high-confidence KOLAS test report issuance.

System Overview

Model / Principle	icomby / QMS + FTIR
QMS Spec.	Equivalent to iquad-s QMS module

Performance

Measurable Gases	H_2, CH_4, CO, CO_2, N_2, O_2, He, Ne, Ar, Xe, Kr, SF_6, CF_4, NF_3, etc.

System Configuration

Main Power	AC 220V, max 8A, 50/60 Hz, Single-phase
Operating Temp.	RT ~ 40°C
Humidity	0–80% (non-condensing)

Installation Requirements

Dimensions (W×D×H)	770 × 650 × 1,160 mm
Weight	160 kg

* Product design and specifications may change without prior notice per customer requirements.

Product

itof

Time-of-Flight MS for Advanced Process Monitoring

itof is our Time-of-Flight Mass Spectrometry (TOF-MS) platform designed for advanced process monitoring. Unlike conventional QMS systems that scan mass sequentially, itof captures the full mass spectrum simultaneously, enabling detection of rapid process changes in CVD, etch, and chamber cleaning applications. Its wide mass range supports measurement of both light carrier gases and heavy process precursors in a single analysis. Multiple itof-based process monitoring systems have been supplied to Samsung Display.



Key Features

01

Simultaneous Full-Spectrum

All mass species are detected in a single measurement event — not scanned sequentially. At 2,000 scans/sec, no transient process event is missed, regardless of how brief or unexpected.

02

Wider Mass Range than QMS

Mass range 0.7–500 amu covers light gases (H_2, He) through heavy organic precursors and fluorinated species — broader than conventional QMS systems. Triple MCP detector for high sensitivity.

03

Production-Proven at Tier-1 Fabs

itof has been delivered to and used in production process monitoring at Samsung Display — one of the world's most demanding display manufacturing environments. Performance verified under real fab conditions.

System Overview

Model / Principle	itof / Time-of-Flight Mass Spec-trometry (TOF-MS)
Ion Source	E-gun (Tungsten Filament)
Electron Im-pact Energy	70 eV (adjustable)
Detector	Triple MCP (Microchannel Plate), 0.5 inch diameter
Drift Tube Length	230 mm

Performance

Mass Range	0.7–500 amu
Resolution	100 amu
Mass Scan Speed	2,000 scans/sec (0.7–500 amu)
Max Ion Source Pres-sure	> 1×10^{-5} Torr

System Configuration

OS	Windows 10
Output	CSV file

Installation Requirements

Dimensions (W×D×H)	500 × 400 × 500 mm
Weight	30 kg

* Product design and specifications may change without prior notice per customer requirements.

Product

ioes

Real-Time Plasma Monitoring with OES

ioes is an OES-based process monitoring system that analyzes plasma emission from ions and radicals inside process chambers. By monitoring specific wavelength intensities in real time, it enables continuous observation of chemical species and process conditions. The system can simultaneously determine refractive index and deposited film thickness, making it suitable for advanced CVD process monitoring. Following deliveries in 2021 and 2022, the third ioes system was supplied to Samsung Display in 2025.



Key Features

01

Non-Invasive In-Situ Monitoring

OES via optical fiber — no process gas contact, no contamination risk, no chamber modification beyond viewport access. The measurement is fully transparent to the process.

02

EPD + Film Thickness

Beyond standard endpoint detection, ioes simultaneously monitors the refractive index of wafer/glass and the thickness of deposited films from CVD process plasma emission — in real time.

03

Full UV–NIR Coverage

Wavelength range 200–1,050 nm (UV, VIS, and NIR options). Optical resolution 0.3–10 nm FWHM. Min. exposure time 1 msec. Covers virtually all plasma-relevant emission lines in semiconductor and display processes.

System Overview

Model / Principle	ioes / OES (Optical Emission Spectroscopy)
Detector	Sony ILX511 (UV Enhanced Coated)
Fiber Coupler	SMA905 or FC standard

Performance

Signal-to-Noise Ratio	> 250:1
Full Wavelength Range	200–1,050 nm
UV Range	200–450 nm
VIS Range	380–760 nm
NIR Range	550–1,050 nm
Optical Resolu-tion	0.3–10 nm FWHM
Min. Exposure Time	1 msec

System Configuration

OS	Windows 10 (32/64-bit)

Installation Requirements

Dimensions (W×D×H)	90 × 70 × 44 mm
Weight	0.4 kg

* Product design and specifications may change without prior notice per customer requirements.

Product

imerge

Integrated Platform for Process & Emission Monitoring

imerge integrates QMS, TOF-MS, and OES into a single rack-mounted system for comprehensive process and emission monitoring. By combining exhaust analysis with in-process diagnostics, it supports process optimization, greenhouse gas reduction, and compliance reporting in semiconductor and display manufacturing.



Key Features

01

Triple-Technology Integration

QMS (iquad-s), TOF-MS (itof), and OES (ioes) operate in a single synchronized system — eliminating inter-instrument timing errors and enabling correlated multi-modal data analysis from one interface.

02

GHG Usage Optimization

Accurately monitors the quantity of greenhouse gases consumed in each process step. Combined with exhaust monitoring, imerge provides the full GHG mass balance needed to develop 20%+ reduction recipes without compromising process performance.

03

Real-Time Full-Spectrum Detection

itof delivers simultaneous full mass spectrum acquisition (0.7–500 amu) at 2,000 scans/sec — capturing every process gas species in real time, including transient events invisible to conventional QMS scanning.

System Overview

Model / Principle	imerge / QMS + TOF-MS + OES
System Components	iquad-s (QMS) + itof (TOF-MS) + ioes (OES)
Measurable Gases	H_2, CH_4, CO, CO_2, N_2, O_2, He, Ne, Ar, Xe, Kr, SF_6, CF_4, NF_3, HF, HCl, C_2F_6, C_3F_8, C_4F_8, etc.

Performance

QMS Spec.	Refer to iquad-s specification
TOF-MS Spec.	Refer to itof specification (0.7–500 amu / 2,000 scan/sec)
OES Spec.	Refer to ioes specification (200–1,050 nm)

System Configuration

Main Power	AC 220V, max 8A, 50/60 Hz, Single-phase
Operating Temp.	RT ~ 40°C
Humidity	0–80% (non-condensing)
Elevation	2,000 m or less

Installation Requirements

Dimensions (W×D×H)	770 × 650 × 1,300 mm
Weight	150 kg

* Product design and specifications may change without prior notice per customer requirements.

Product

ivacuum

Engineered Vacuum Solutions for Clean Process Environments

ivacuum is our custom-engineered vacuum system designed for gas analysis, thin-film deposition, and other high-vacuum applications. Each system integrates pumps, gauges, valves, and controls into a fully tested, ready-to-install solution optimized for clean and reliable vacuum environments.



Key Features

01

Application-Optimized Configuration

Each ivacuum is configured to the customer's specific target pressure, pumping speed, gas load, and process compatibility requirements — not a catalog product, but a system designed around your application.

02

TMP-Based Clean Vacuum

Turbomolecular pump as the primary high-vacuum stage ensures an oil-free, hydrocarbon-contamination-free environment — critical for analytical instruments (QMS, OES, TOF-MS) and sensitive process chambers.

03

Integrated & Ready to Install

Pump, gauge, valves, and control electronics are assembled, tested, and delivered as a complete, bench-ready system. Installation and commissioning support available from our vacuum engineers.

System Overview

Model / Principle	ivacuum / TMP + Backing Pump + Vacuum Gauge
Primary Pump	Turbomolecular Pump (TMP)
Secondary Pump	Backing pump (dry scroll or equivalent — configuration dependent)
Vacuum Gauge	Combination gauge (Pirani + ionization, configuration dependent)

Performance

Pumping Speed	80–700 l/s (configuration dependent)
Ultimate Pressure	< 10^{-6} mbar

System Configuration

Main Power	AC 220V, max 5A, 50/60 Hz, Single-phase
Operating Temp.	RT ~ 40°C (standard configuration)
Custom Options	Multi-port, corrosive-gas compatible materials, remote monitoring output, interlock interface

Installation Requirements

Dimensions (W×D×H)	550 × 500 × 650 mm
Weight	50 kg

* Product design and specifications may change without prior notice per customer requirements.

Service

GHG Measurement & Consulting(KOLAS)

As a KOLAS-accredited lab, we accurately measure high-GWP greenhouse gas reduction in semiconductor and display processes, issuing internationally recognized test reports.

Why this measurement matters now

The 4th Phase of Korea's Emissions Trading Scheme (2026–2030) introduces stricter MRV rules and expanded benchmark allocation. With the semiconductor and display sectors included since 2015, these updates now demand higher standards for accurate emission measurement and reliable verification reports.

GHG Usage in Semiconductor & Display Manufacturing



Gas Name	Chemical Formula	Primary Use	GWP
Sulfur Hexafluoride	SF_6	Insulation, Etching	23,900
Nitrogen Trifluoride	NF_3	Chamber Cleaning	17,200~17,400
Carbon Tetrafluoride	CF_4	Etching, Cleaning	6,500
Nitrous Oxide	N_2O	Oxide Film CVD	310
Trifluoromethane	CHF_3	Etching	11,700
Hexafluoroethane	C_2F_6	Etching	9,200

GHG Reduction Facility Efficiency Measurement

Standard Code	Standard Name (Summary)	Accreditation Scope (Key)
National Institute of Environmental Research Notice No. 2024-28 (ES 13501)	GHG Process Test Standard — Non-CO_2 GHG in Industrial Processes: Infrared Absorption Spectroscopy	Concentration: CF_4, C_2F_6, C_3F_8, C_4F_8, CHF_3, SF_6 (0.02–150,000) μmol/mol Concentration: CH_2F_2, NF_3, N_2O (0.05–150,000) μmol/mol Reduction efficiency: (5–99.99) %
KSI 0587:2023	Stationary Emission Sources — Volumetric Flow Measurement of Non-CO_2 GHG in Semiconductor & Display Processes	Concentration: CF_4, SF_6, (0.02–150,000) μmol/mol Concentration: NF_3, N_2O (0.05–150,000) μmol/mol Volumetric flow rate, Reduction efficiency: (5–99.99) %

Measurement Process

A complete one-stop service, from calibration to certification.

STEP 01	STEP 02	STEP 03	STEP 04
Pre-Consultation & Scheduling	**On-Site Visit & Measurement Setup**	**Fully Automated SW-Based Measurement**	**Result Analysis & Test Report Issuance**
Pre-confirmation of target equipment, gas types, schedule, and required documentation	Delivery of measurement equipment, calibration, and confirmation of measurement points	Measurement and data collection via proprietary fully automated software. Minimized human intervention reduces measurement error.	We issue KOLAS-accredited test reports after review, which are internationally valid under the ILAC Mutual Recognition Arrangement.

What Sets Apart

Building customer trust through years of validated measurements.



KOLAS-Accredited Testing Laboratory

KOLAS-accredited since September 2024 (KT1218), we provide internationally recognized GHG reduction efficiency test reports under the ILAC Mutual Recognition Arrangement.

Fully Automated Measurement System

Every step from calibration to measurement and result generation is automated through our proprietary software. By minimizing human intervention, we reduce measurement error and deliver fast, consistent results.

20+ Years of Field Experience

Since our founding in 2004, we have delivered gas analysis services across diverse industries including semiconductors, displays, steel, and power. The measurement know-how gained from this experience underpins our accuracy.

Proven Track Record-Domestic & Global

We serve leading domestic manufacturers including Samsung Electronics, Samsung Display, LG Electronics, LG Display, KEPCO, and POSCO, as well as global fabs such as GlobalFoundries (Singapore) and Micron Technology (Taiwan).

Target Industries

Korea's top semiconductor and display manufacturers and global foundries have chosen us.



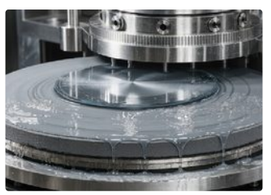
01] Semiconductor

Memory, Foundry, System Semiconductor



02] Display

OLED, LCD, and Other FPD Manufacturers



03] Target Processes

OLED, LCD, and Other FPD Manufacturers



04] Measurable Gases

SF6, NF3, CF4, N2O, CHF3, C2F6, C3F8, C4F8, CH2F2

Service

Process Chamber Monitoring

We analyze the gas composition inside plasma process chambers in real time using our proprietary itof (TOF-MS) and ioes (OES) systems.

Anomalies are detected the moment they occur — preventing yield loss, protecting equipment, and building the data foundation for AI-driven process automation.

Service Process

From system installation to continuous insight — a seamless monitoring partnership.

STEP 01 **Pre-Consultation & System Design**	STEP 02 **On-Site Installation & Calibration**	STEP 03 **Continuous Real-Time Monitoring**	STEP 04 **Data Reporting & Advisory**
Confirmation of target chambers, process steps, required gas species, and integra-tion with customer's control system.	Equipment delivery, system integration on-to chamber foreline or viewport, calibration against certified refer-ence gases, and base-line measurement.	Fully automated con-tinuous data acquisi-tion. Real-time alerts for anomalies, end-point events, and out-of-spec conditions de-livered to the custom-er's monitoring inter-face.	Periodic data review with our application engineers. Trend anal-ysis, process drift re-porting, and chamber maintenance schedul-ing recommendations.

Why Real-Time Monitoring Matters

As semiconductor nodes shrink and display processes become more complex, a single gas anomaly can lead to wafer loss, equipment damage, and costly re-qualification. Real-time monitoring is no longer optional — it is essential for maintaining yield and process stability.

Processes such as plasma etching, CVD, and chamber cleaning rely on tightly controlled reactive gases including SiF_4, CF_4, NF_3, and HF. Even small concentration changes can directly impact process performance and yield.

Key Industry Drivers

Shrinking Nodes	Equipment Uptime Pressure	AI Process Auto-mation
At 3 nm and be-low, even trace contamination causes defect den-sities that destroy yield. Tighter pro-cess windows de-mand continuous gas-phase surveil-lance.	Real-time endpoint detection enables condition-based chamber cleaning, reducing unneces-sary downtime by up to 30% vs. OEM schedules.	AI/ML-based pro-cess control sys-tems require high-frequency, high-fidelity sensor data. Real-time mass spectrometry and OES are primary inputs for next-generation fault detection models.

Monitoring Technologies

itof

Time-of-Flight MS

Simultaneously detects all gas-phase species with high mass resolution. Ideal for CVD process monitoring, precursor quantification, and multi-component etch chemistry analysis.

ioes

Optical Emission Spectroscopy

Non-invasive plasma diagnostics via optical fiber. Monitors plasma temperature, species concentrations, and etch endpoint in real time without contacting the process gas stream.

ioes-Ad

APD Sensor

Transmission-based optical sensing for high-sensitivity, narrow-band gas detection. Complements OES in processes where plasma emission is weak or masked by chamber geometry.

What Sets Apart

Proprietary monitoring technologies, proven deployment experience, and over 20 years of gas analysis expertise deliver reliable process insights in real time.



Proprietary In-House Technology

our itof and ioes systems are developed entirely in-house, with technology licensed from the Korea Institute of Machinery & Materials (KIMM). This means faster application customization, deeper technical support, and no dependency on third-party vendors.

Simultaneous Multi-Species Detection

itof detects all gas-phase species simultaneously in a single measurement cycle — not sequentially. This eliminates timing gaps that cause missed transient events and delivers a complete picture of chamber chemistry at every moment.

Field-Proven at Tier-1 Fabs

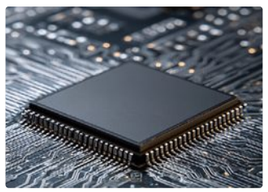
Samsung Display has received multiple deliveries of our ioes systems (most recently in 2025) for production process monitoring. This track record at one of the world's most demanding display fabs validates system reliability and measurement accuracy.

20+ Years of Gas Analysis Expertise

Founded in 2004, we bring deep application knowledge in low-vacuum gas analysis across semiconductor, display, steel, and power industries. Our engineers understand not just the instruments, but the process chemistry.

Target Industries

Supporting semiconductor and display manufacturing with real-time process intelligence.



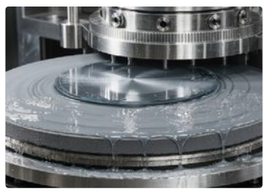
01] **Semiconductor**

Memory, Foundry, System Semiconductor



02] **Display**

OLED, LCD, and Other FPD Manufacturers



03] **Target Processes**

Etch, CVD, Chamber Cleaning, Lithography Support



04] **Monitoring Method**

itof (TOF-MS), ioes (OES), ioes-Ad (APD)

Service

Gas Analysis & Sampling

We provide qualitative and quantitative gas analysis services for customers who cannot easily perform gas analysis in-house.

Using QMS-based technology, we cover what conventional GC and FT-IR cannot — including low-vacuum ultra-trace gases, above-atmospheric pressure samples, and absolute component quantification — all in a one-stop service from on-site sampling to laboratory-grade precision.

Why Conventional Analysis Falls Short

GC and FT-IR remain widely used gas analysis tools, but both have limitations in semiconductor and OLED applications. GC requires batch sampling and laboratory transport, while FT-IR struggles with ultra-low concentration detection and complex multi-component gas mixtures.

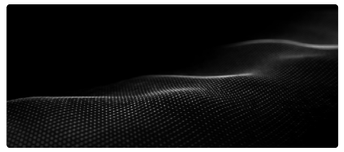
Our QMS-based platform overcomes these challenges by enabling wide-pressure-range analysis, simultaneous multi-component identification, and absolute quantification in a single measurement cycle.

Conventional vs. el Analysis

Capability	GC / FT-IR	el (QMS-based)
Low-vacuum gas analysis	× Not supported	✓ Supported
Above-atm pressure samples	× Limited / risky	✓ Supported
Ultra-trace detection (ppm)	△ FT-IR only (limited)	✓ 5 ppm ±3%
Absolute compo-nent quantity	△ Indirect calculation	✓ Direct measurement
Multi-component simultaneous	△ GC: sequential only	✓ Simultaneous
On-site sampling + lab analysis	× Separate workflows	✓ One-stop service

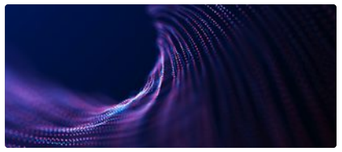
Service Scope & Analytical Capabilities

From on-site sampling to laboratory analysis, we deliver complete qualitative and quantitative gas analysis across diverse industries.



Qualitative Analysis
(Component Identification)

Identification of all gas species by mass-to-charge ratio: O_2, N_2, H_2, Ar, CO_2, CO, H_2O, and complex organic/fluorinated species in a single scan.



Quantitative Analysis
(Concentration & Absolute Amount)

Precise concentration measurement (ppm-level) and absolute quantity of each component. Ideal for sealed enclosure gases where total volume is known.



On-Site Sampling
(Field Collection to Lab Analysis)

Proper sample collection from process lines, enclosures, tunnels, or confined spaces. End-to-end chain of custody from site to laboratory report.

Application Areas & Sample Types

Explore how our gas analysis services are applied across different industries, sample types, and measurement objectives.

Industry / Applica-tion	Sample Type	Key Analysis Need
OLED Display	Internal cell gas (sealed enclosure)	Outgassing ID, moisture & O_2 contami-nation, absolute quantity measurement
Semiconductor Fab	Process line gas, vacuum chamber re-sidual	Trace contaminant ID, multi-component composition, sub-ppm species detec-tion
Steel / Metal In-dustry	Furnace gas, ladle atmosphere, process exhaust	CO, CO_2, H_2, N_2 composition; trace im-purity monitoring
Power Generation	SF_6 insulation gas (transformers, switch-gear)	Decomposition product analysis, purity verification, leak detection
Construction / Tunneling	Confined space air, tunnel excavation atmosphere	Hazardous gas ID (CO, H_2S, CH_4, NO_2), occupational safety assessment
R&D / Materials Science	Novel material outgassing, vacuum sys-tem cleanliness	Outgassing rate, species identification, ultra-trace level characterization

Service Process

From system installation to continuous insight — a seamless monitoring partnership.

STEP 01 Consultation & Sample Plan	STEP 02 On-Site Sampling	STEP 03 Laboratory Analysis	STEP 04 Report & Consultation
Understand sample type, application con-text, target species, required detection lim-its, and whether field sampling is needed.	el engineers collect samples from process lines, sealed enclo-sures, confined spaces, or exhaust streams using appropriate con-tainers.	QMS-based analysis (iquad system) — sim-ultaneous multi-component qualitative and quantitative analy-sis. Detection to 5 ppm ±3%.	Complete analysis re-port with species iden-tification, concentra-tions, and absolute quantities. Technical consultation on results and recommended follow-up.

What Sets Apart

From sampling to reporting, we deliver reliable gas analysis beyond conventional methods.



Beyond GC & FT-IR — QMS-Based Platform

Our iquad system uses QMS to analyze gas samples across the full pressure range — from low vacuum to above atmospheric pressure. This enables analysis of sample types physically incompatible with GC or FT-IR, including sealed OLED cell gases and pressurized SF_6 containers.

Absolute Quantity Measurement

Unlike concentration-only techniques, we measure the absolute amount of each gas component inside a sealed sample. Critical for OLED panel quality control, sealed package leak assessment, and any application where total gas inventory matters.

20 Years of Low-Vacuum Ultra-Trace Expertise

Since 2004, we have specialized in low-vacuum gas analysis — requiring precise vacuum system engineering, calibration methodology, and ion source management. This enables reliable measurement at sensitivity levels standard service labs cannot achieve.

One-Stop Service — Field to Report

From on-site sample collection to laboratory analysis and final consultation, we manage the complete workflow. Single point of contact, consistent chain of custody, results directly applicable to quality decisions, safety assessments, or regulatory reporting.

Service

Vacuum Consulting

Gas analysis begins with vacuum. We provide expert consulting on vacuum system design, optimal component selection — fittings, valves, regulators, pumps, and gauges — custom pumping station builds, on-site troubleshooting, and equipment rental. Whether you need a single fitting or a complete multi-port high-vacuum station, we deliver solutions optimized for your process and budget.

Four Service Pillars

Backed by 20 years of vacuum engineering expertise, we deliver end-to-end solutions from consulting and custom design to component supply and system rental.

Vacuum Consulting

Expert assessment, pressure range analysis, component compatibility review, leak diagnosis

Custom Design

End-to-end custom pumping stations — benchtop to multi-port high-vacuum stations

Component Supply

KF/CF/ISO fittings, gate/butterfly/needle valves, regulators, MFCs, vacuum gauges

System Rental

Short-term rental of gas analysis systems and vacuum pumping equipment

Vacuum System Consulting

System Architecture Review	Component Com-patibility Audit	Leak Detection & Troubleshooting
Pump selection, pip-ing layout, valve placement, conduct-ance path, and bot-tleneck identification	Seal, valve body, and fitting compati-bility with process gas chemistry — critical for corrosive environments	Systematic diagnosis of vacuum leaks, virtual leaks, and outgassing sources; supported by our QMS capability
Pump Selection Advisory	**Pressure Control Optimization**	**New System Inte-gration**
Matching pump technology (scroll, turbomolecular, ro-tary vane, ion, cryo) to application re-quirements	Throttle valves, but-terfly valves, and electronic pressure controllers for stable CVD/etch/analytical pressure	Advisory for inte-grating QMS, OES, or FTIR into existing vacuum infrastruc-ture; foreline man-agement & contam-ination prevention

Custom Pumping Station Design (ivacuum)

Configuration	Target Application	Key Features
Benchtop Single-Port	R&D labs, university research, single in-strument support	Compact footprint, scroll or turbo pump, KF/CF flange
Multi-Port HV Sta-tion	Multi-chamber re-search, advanced materials develop-ment	Independent ports, gate valve isolation, shared turbo + backing pump
Process-Integrated Station	Semiconduc-tor/display fab ana-lytical instrument integration	Corrosive-gas com-patible (SUS316L, PTFE seals), remote monitoring, interlock
Custom UHV Con-figuration	Surface science, par-ticle physics, quan-tum device research	Ion/NEG pump, bakeable CF flanges, pressure ≤ 10^{-9} hPa

Component Supply & Equipment Rental

Category	Typical Components	Key Selection Criteria
Fittings & Flanges	KF (ISO-QF), CF (ConFlat), ISO-F, VCR, Swagelok-compatible, reducers, crosses, tees	Vacuum level, connec-tion frequency, material (SUS304/316L, Al), gas-ket type
Valves	Gate, butterfly (manu-al/motorized/pneumatic), angle, needle, ball, vent valves	Pressure range, actuation method, process gas compatibility, flow con-ductance
Regulators & MFCs	Pressure regulators (in-let/outlet), mass flow controllers, flow meters	Gas compatibility, flow range, pressure differen-tial, corrosion resistance
Vacuum Pumps	Dry scroll, rotary vane, turbomolecular, dia-phragm, ion, NEG pumps	Ultimate pressure, pumping speed, process gas type, oil-free re-quirement
Gauges & Sensors	Pirani, Bayard-Alpert ioni-zation, capacitance ma-nometers, combination gauges	Pressure range, gas-species independence, sensitivity, control output compatibility
Seals & Accessories	O-rings (Viton, Kalrez, PTFE-encapsulated), cop-per/Al gaskets, blank flanges, feedthroughs	Temperature compatibil-ity, chemical resistance, bakeable vs. non-bakeable requirement

Equipment Rental Service

Equipment	Rental Use Case	Notes
iquad / iquad-s (QMS Gas Analysis)	On-site gas analysis campaigns, R&D charac-terization, and instrument evaluation before pur-chase.	el engineers available for on-site support; calibra-tion maintained by el
icomby (GHG Measure-ment)	Short-term GHG scrub-ber efficiency campaigns; temporary KOLAS ca-pacity coverage	Requires el operator for KOLAS-valid measure-ments; test report issua-ble on request
itof (TOF-MS Analyz-er)	Process development gas composition studies; instrument evaluation for monitoring programs	Application setup sup-port; suitable for R&D and pre-production de-velopment
Vacuum Pumping Stations	Temporary capacity for maintenance windows; backup during primary pump service; R&D lab setup	Configuration matched to customer's flange type and pressure re-quirement

What Sets Apart

20 years of vacuum engineering experience, from component selection to complete system design.



Operator's Perspective

Our own QMS and mass spectrometry systems operate in the 10^{-4} to 10^{-6} hPa range. Every component we recommend has been evaluated against the same standards we apply to our own instruments.

Gas Analysis Integration

We provide both vacuum consulting and gas analysis services — uniquely positioned to diagnose problems at the interface between the vacuum system and the analytical instrument.

20 Years Across Diverse Applications

From semiconductor process chambers and OLED deposition systems to power generation SF_6 equipment and university research setups — We have solved vacuum challenges across a wide spectrum of industries.

End-to-End Accountability

Whether a single fitting recommendation, a complete pumping station build, or a rental with on-site analytical support, We provide a single point of accountability. No need to manage multiple suppliers.

el expand your limits

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