

# ICP-3003

**INDUCTIVELY COUPLED PLASMA  
OPTICAL EMISSION SPECTROMETER**

**SUPERIOR PERFORMANCE**

**FASTER ANALYSIS**

**EASIER OPERATION**

**LOWER RUNNING COST**



**EPC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES**

**Analytical Technologies Limited**

An ISO 9001 Certified Company

[www.analyticalgroup.net](http://www.analyticalgroup.net)

ICP-3003 inductively coupled plasma emission spectrometer is a powerful performance, simultaneous full-spectrum direct-Reading Spectrometer developed by Analytical technologies Limited Which is used for trace elemental analysis in diverse Samples (soluble in hydrochloric acid, nitric acid, hydrofluoric acid, etc). The instrument offers capabilities with automatization, Stability, reliability and ease of use. It is currently widely applied in various fields of rare earth, geological, metallurgical, chemical, environmental, clinical medicine, petroleum, Semiconductor, food, biological samples, criminal science and Agricultural reserch, etc...

## ▶▶▶ APPLICATION FIELDS

- Silicon Industrial: magnetic materials
- Metallurgical: analyze As, Bi, Pb, Sb, Sn and other impurity elements, which effect greatly the metallic materials quality.
- Water analysis; analyzer 8 heavy metal elements
- Geological, minera: analyzer Ca, Mg, Na, Fe, Cu , Mn, Zn, Co, Ni, Au Ag, and other elements in the rock samples
- Petrochemical and industrial: Analyzer over 30 elements in crude oil, mainly Fe, Na, Mg, Ni, V, Ca, Pb, Mo, Mn, Cr, Co, Ba, As, etc.
- Pharmaceutical, health, agriculture and environmental and food safety

## ▶▶▶ ADVANTAGES

### **Full automation design**

The instrument is thoroughly computer-controlled except the power switch, which is reliable, safe and convenient.

### **Peristaltic pump**

A high precision 12 roller, 4 channel peristaltic pump, with speed adjustable according to the demanding, provides smooth, stable rate consistent with the drain rate, which is adjusted as per required to stabilize the introduction system.

### **Auto-control of gas flow**

In the sample introudction system, the carrier gas, plasma gas, auxiliary gas are controlled through the advanced mass flow controller (MFC), features continuously adjustable and stable, etc... which ensures the stability of the introduction system and the foundation for the stable light source

### **Precise wavelength positioning**

Intelligent, precise automatic wavelength calibration algorithm, achieves the measurement without additional peaks calibration, to ensure an accurate measurement while saving solution and measurement time

### **Fast, accurate auto-matching**

The load terminals employs the full-automatic matching technology developed by Analytical technologies Limited, features fast matching, high precision, etc., which could achieve maximum output power, enhance power efficiency, ensure the stability of the instrument whilst facilitating ignition.

### **Ultra-fast analysis speed**

The analyst can set any suitable integration time for all the analytical lines in one exposure to achieve optimal measurement, or acquire the intensity integral value in the end of the exposure to enable the analysis faster, or specify any one or several specific line (s) to read-out (the readout time 2ms.)

### **Powerful software analysis function**

Software is easy to operate and intuitive, it offers the capability with qualitative, semi-quantitative and quantitative analysis, instrument diagnostics, intelligent optimization, flexible full-spectrum research function, strong offline reprocessing scientifically intelligence background correction and interference cancellation algorithm, which enable the analysis more professional and accurate.

### **Advanced sample introduction system**

The sample introduction system is efficient and stable, equipped with various nebulizers and spray chambers, it can also be equipped with high solids nebulizer, hydrogen fluoride-resistant nebulizer, etc. as per required. Besides, the operation, and further improves the analysis efficiency.

### **Stable, advanced solid-state RF power**

The instrument employs the solid-state RF power developed by Analytical Technologies Limited, which is compact and delivers reliable performance with the power stability and safety, to further improve the instrument's stability and security.

### **Superb optical system**

Adopting the echelle-prism cross-dispersion type polychromator, elegant optical optimization design maximizes the flux whilst enabling the excellent spectral resolution. NO movable optical components achieve unparalleled long-term stability: Ultra-low stray light design with the unique optical design greatly reduces the background interference and further improves the detection limit. A highly efficient N<sub>2</sub> distributed purge system for the optical tank combined with the high quality optics ensures deep.

### **Excellent performance detector**

Employing the CID detector, which is advanced, mature and stable, largest-size active area, megapixel. Full-frame imaging ability to capture the entire ICP-OES spectrum (165-900nm) permits quantitative analysis. Non-destructive readout improves the signal-to-noise ratio of weak analyte lines and ensures the precision of results, whilst enabling data acquisition and analysis faster than CCD. Excellent linear dynamic range and inherent anti-blooming capability allow the measurement of weak analyte emission signals adjacent to intense emission signals, whilst providing flexibility to choose the ideal wavelength for a method (alternative secondary and tertiary lines to overcome interferences).

## ▶▶ TECHNICAL PARAMETERS

RF Generator	
Input Power	AC 220V, 20A
Output Power	700-1600W
Accuracy	2W
Working Frequency	27.12MHz
Frequency stability	0.05%
Output power stability	0.1%
Match method	auto-matching
Electromagnetic leakage radiation intensity	Electric field intensity $E < 0.5V/m$ at 30cm away from the chamber

Introduction sample system	
Output coil	Inner-diameter 25mm, 3 turns
Quartz tri-concentric torch	Outer-diameter 20mm. Various center channel size model optional
High-efficient nebulizer	Concentric nebulizer outer-diameter 6mm. Various models (high-salt, anti-HF, etc. optional)
Spray chamber	Scott spray chamber, the cyclonic spray chamber with outer diameter 57.2mm optional 12-Roller 4-channel the rotation speed can be adjusted according to the demanded flow
Peristaltic pump Total Consumption(Ar)	14L/min
Argon flow meter/carrier gas pressure gauge specifications	Plasma gas flow meter (100-1000)L/h (1.6-16L/min)
	Auxiliary gas flow meter(6-60)L/h (0.1-1L/min) Carrier
	gas flow meter (0.1-1L/min) Carrier gas
	Regulator valve (0.2MPa)
	Cooling water: Water temp.20-25 Flow>5L/min Pressure>0.1MPa

Spectrometer specification	
Ruled echelle grating	52.67 lp/mm, 64 blaze angle, the substrate is made of the feature near-zero thermal expansion coefficient, enabling outstanding performance
Prism Wavelength	175nm~900nm for standard, extended to 165nm-900nm by choosing DUV optical components
Range	Ultra-pure Corning UV fused silica, transmittance 99.6% at 170nm.
Effective Focal length	430mm
Numerical aperture	F/8, ultra-high flux ensures the instrument detection limit and sensitivity
Resolution	0.0068nm@200nm
Stray light	Equivalent background concentration of 10000ppmCa solution <1ppm at As 189.042nm
Optical chamber	Precisely thermostat, 35±0.1 Distributed N2 purge 2L/min, fast purge 4L/min

Detector Device	
Detector Type	Charged injection detector (CID)
Pixel Size	27 x 27, Random Access Integration (RAI)
Read mode	Full frame readout (FF), Random Access Integration (RAI) with non-destructive read
Linear dynamic range	(NDRO) 10 <sup>8</sup>
Wavelength response range	165nm-1000nm
Electronic shutter	Set the integration time of each line; specify the individual line to read out (read time <2ms)
Quantum efficiency	No coating, up to 35% within 200nm UV region
Detector cooling	High efficiency triple stage thermoelectric cooling device maintains the detector at a constant -45°C

Instrument Specifications	
View mode	Radial view
Liquid content	0.01ppm-several thousands ppm
Solid content	0.001% 70%
Repeatability	(Short-term stability) relative standard deviation RSD <0.5%
Stability	Relative standard deviation RSD ,1% within 2 Hours
Analysis speed	Single line CID readout time is 2ms, analysis for all elements can be achieved within one minute
Detection limit( $\mu\text{g/L}$ )	Desktop 1300mm*840mm*740mm

Typical detection limit of elements									
<b>Element</b>	<b>Ag</b>	<b>Ba</b>	<b>Be</b>	<b>Ca</b>	<b>Cr</b>	<b>Cu</b>	<b>K</b>	<b>Li</b>	<b>Mg</b>
<b>Wavelength</b>	328.068	455.403	311.107	393.366	267.716	326.754	766.49	670.784	279.553
<b>Detection limit</b>	1.31	0.1	0.06	0.02	1.3	1.1	4.9	0.2	0.05
<b>Element</b>	<b>Mn</b>	<b>Mo</b>	<b>Na</b>	<b>Ni</b>	<b>Sr</b>	<b>Ti</b>	<b>V</b>	<b>Zn</b>	
<b>Wavelength</b>	257.61	202.03	Na	589.592	407.771	336.121	309.331	231.856	
<b>Detection limit</b>	0.22	1.11	1.43	2.19	0.034	0.42	0.88	0.47	

Instrument configuration		Working environment	
Fully automated matcher	Manual	Store & transport temp.:15-25	Power adaptability
The sample introduction system	Detection device	Store & transport relative humidity:<70%	220+10V
Linear dynamic range	Spectrometer	Working humidity: <70%	50-60Hz
Fully automated solid-state RF power	Computer system	Working temp.:15-30	
Auto-controlled cooling water apparatus			

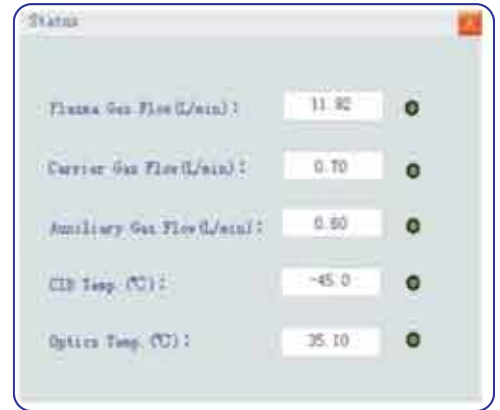
## ▶▶ SOFTWARE ADVANTAGES

### ICp-3003 software

ICp-3003 operating software can control all functions of the instrument, including plasma, gas flow control (Figure 1), and security monitoring (Figure 2), etc...



(Figure 1)



(Figure 2)

## ▶▶ ANALYSIS SOFTWARE

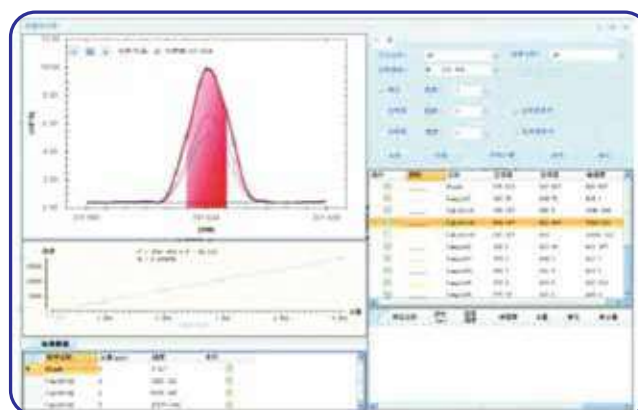
Specifying individual pixel or subarray region for quantitative analysis



(Figure 3)

(Figure 4)

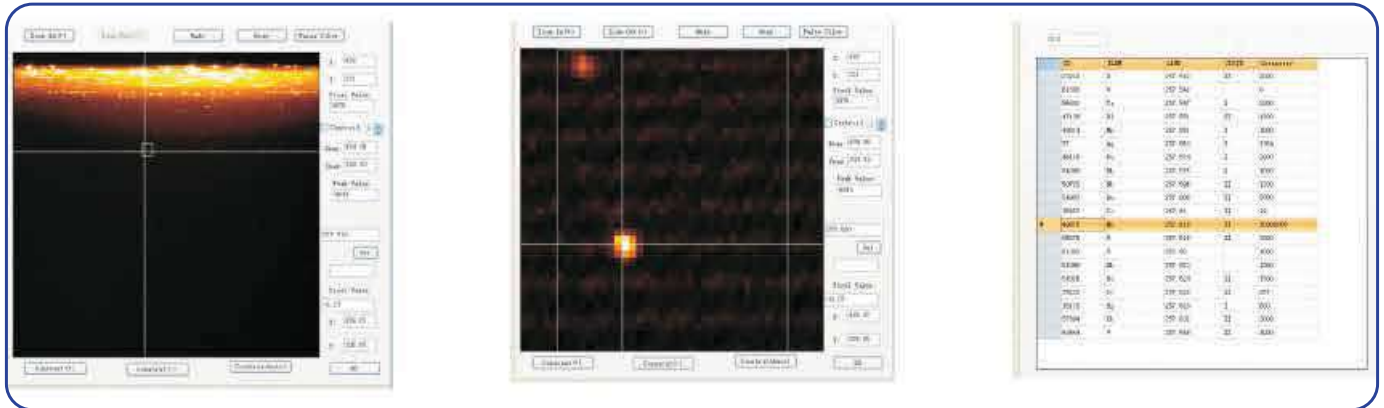
Methods and data set management, re-processing, auto or manual real-time background correction



(Figure 5)

### Full frame spectrum mode

Qualitative & semi-quantitative analysis of the elements-showing complete emission spectra, intensity, auto-peak identification and interactive spectral library



Auto sample mode: the sampler is provided as required

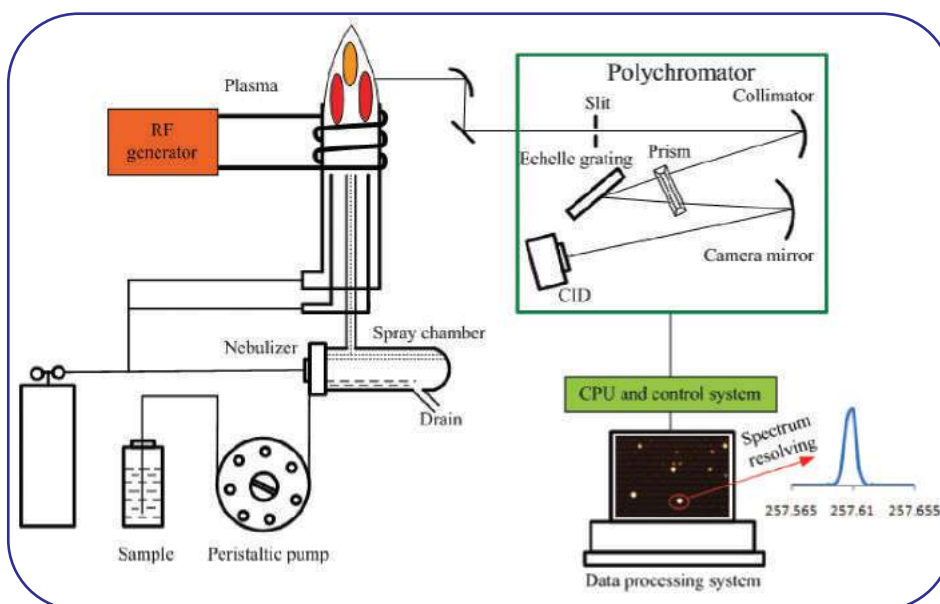
Calibration type: multi-point calibration curve, of which the number of the standard points is not limited.

Curve fitting display: linear, auto-adjust the range.

Data report: export the report based on sample names, method names, elements, intensity, concentration, mean, standard deviation, relative standard deviation, time, date, etc., and generate the analysis report automatically.

Optional format: analysis data can be stored in user-specified data format, e.g. Excel, Word, PDF, image, etc...

### ▶▶ INSTRUMENT STRUCTURE DIAGRAM:





▶▶ **HPLC Servicing, Validation, Trainings and Preventive Maintenance :**

- HPLC Servicing : We have team of service engineers who can attend to any make of HPLC promptly @the most affordable cost.
- Trainings :We also take up preventive maintenance to reduce downtime of HPLC’s Trainings.
- AMC’s/CMC : We offer user training both in-House and at customer sites on PLC principles, operations, troubleshooting.
- Validations : We have protocols for carrying out periodic Validations as per GLP/ GMP/U SFDA norms.
- Instruments : We offer instruments/Renting Services Modules like pumps, detector etc. on Rent.



▶▶ **About Analytical Technologies**

Analytical Technologies is synonymous for offering technologies for doing analysis and is the Fastest Growing Global Brand having presence in at least 96 countries across the globe. Analytical Technologies Limited is an ISO :9001 Certified Company engaged in Designing, Manufacturing, Marketing & providing Services for the Analytical, Chromatography, Spectroscopy, Bio Technology, Bio Medical, Clinical Diagnostics, Material Science & General Laboratory Instrumentation. Analytical Technologies, India has across the Country operations with at least 4 Regional Offices, 6 Branch Offices & Service Centers. Distributors & Channel partners worldwide.

▶▶ **Our Products & Technologies**

						
UV/VIS Spectro 2060+ Double Beam	FTIR	Gas Chromatograph 3000	Gas Chromatograph 2979 Plus	Flash Chromatograph	Atomic Absorption Spectrophotometer	Liquid Partical Counter
						
Optical Emission Spectrophotometer	DSC/TGA	NOVA 2020 plus Automated Bio Chemistry Analyzer	HEMA 2020 Hematology Analyzer	Micro Plate Reader/Washer	URINOVA 2800 Urine Analyzer	Total Organic Carbon
						
Fully Automated CLIA	NOVA Basic Semi-Auto Chemistry Analyzer	PCR/Gradient PCR/ RTPCR	Blood Gas Analyzer	Random access Analyzer for immunoassay Proteins & clinical chemistry	Semen Analyzer	Water purification system

▶▶ **Regulatory compliances**



▶▶ **Corporate Social Responsibility**

Analytical Foundation is a Nonprofit Organization (NGO) found for the purpose of:



**Analytical**  
**Foundation**

1. Research & Innovation Scientist's awards / QC Professional Award : Quality life is possible by innovation only and the innovation is possible by research only, hence ANALYTICAL FOUNDATION is committed to identify such personalities for their contributions across various field of Science and Technology and awarding them yearly. To participate for award, send us your details of research / testing / publication at [info@analyticalfoundation.org](mailto:info@analyticalfoundation.org)

2. Improving quality of life by offering YOGA Training courses, Work shops / Seminars etc.

3. ANALYTICAL FOUNDATION aims to DETOXYFY human minds, souls and body by means of Yoga, Meditation, Ayurveda, Health Care, Awards, Media, Events, Camps etc.

▶▶ **Reach us @**



**HPLC Solutions    MultipleLabs    Analytical Bio-Med    Analytical Distributors    Analytical Foundation (Trust)**

**Corporate & Regd. Office:**  
Analytical House, # E67 & E68,  
Ravi Park, Vasna Road, Baroda,  
Gujarat 390 015. INDIA

T: +91 265 2253620  
+91 265 2252839  
+91 265 2252370  
F: +91 265 2254395

E: [info@hplctechnologies.com](mailto:info@hplctechnologies.com)  
[info@multiplelabs.com](mailto:info@multiplelabs.com)  
[info@analyticalgroup.net](mailto:info@analyticalgroup.net)  
[info@analyticalbiomed.com](mailto:info@analyticalbiomed.com)

W. [www.ais-india.com](http://www.ais-india.com)  
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