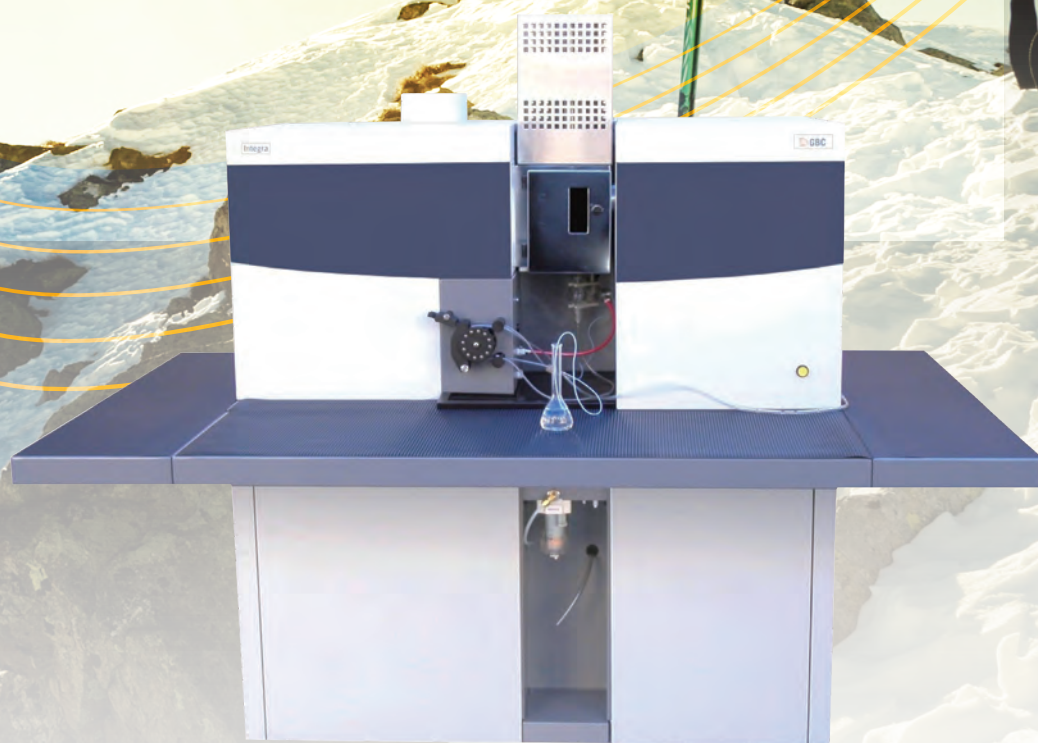


# Integra 6000

Inductively Coupled Plasma  
Optical Emission Spectrometer



ICP-OES





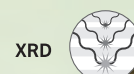
ISO 9001  
Quality Accreditation

GBC has always placed a strong emphasis on quality in all aspects of our operation, from design and manufacture to the provision of service and support to our customers, and we are fully committed to continuous evaluation and improvement in all areas.

The GBC Quality Management System has been accredited to the ISO 9001 quality standard by Lloyd's Register Quality Assurance Limited. This certification is your assurance that the procedures and processes used to produce the goods and services which GBC provides comply with the relevant International Standard, and demonstrates commitment to meeting the needs and expectations of our customers.

Since 1978 GBC has been at the forefront of scientific technological development, manufacturing and marketing a wide range of award winning, quality scientific instruments.

### GBC's Product Lines

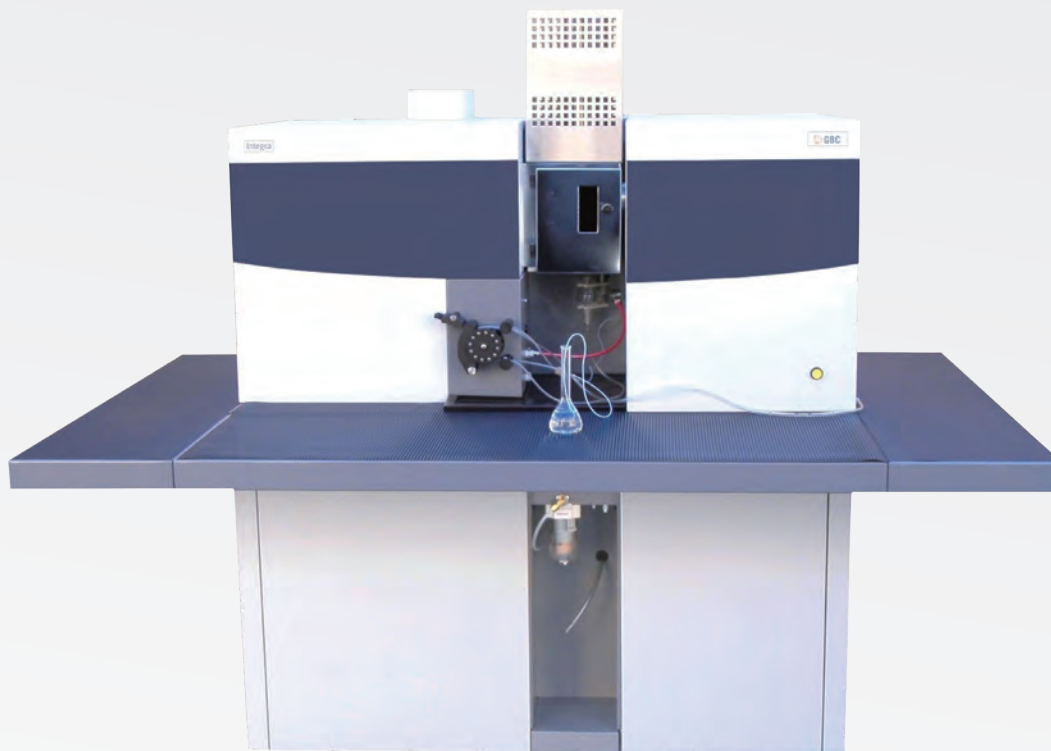


## Visionary Technology

GBC Scientific Equipment will advance people's knowledge and their capacity to enhance the quality of life for all humankind.



# Integra 6000 – A world of experience in elemental analysis



## Integra 6000 raises the standard

The Integra 6000 from GBC draws together a long tradition of excellence in design and engineering, new approaches in user-friendly software and the tested opinions of experienced ICP users around the world. The result is a compact ICP-OES instrument which is fully featured for all ICP applications, simpler to operate, maintain and service, and raises the standard for affordable ICP analysis.

## The Integra success story

GBC's ongoing commitment to elemental analysis was reinforced through our investment in the Integra range of ICP spectrometers. Complementing our highly reputed range of atomic absorption products, the Integra ICP-OES product range answered the increasing demand for enhanced productivity.

The feature-packed Integra ICP has been accepted globally and has rapidly built a reputation for

providing power, flexibility and performance across each of the major fields of application, including environmental monitoring, agriculture, biology, metallurgy, geology and the petrochemical and pharmaceuticals industries.

Integra 6000 breaks new ground, setting higher standards for reliability, performance and productivity in your laboratory.

## Integra 6000

# Highest level of automation permits simple control

### An outstanding range of must have features, all standard on the Integra 6000

For near the price of a fully automated AA, the Integra 6000 sequential ICP provides a comprehensive solution to your elemental analysis requirements. A wide range of outstanding features includes:

- Computer control of over 200 instrument parameters
- Precise mass flow gas control of nebulizer gas (with optional mass flow of plasma and auxiliary gas)
- The durability of the free-running 40.68 MHz RF generator, offering the highest efficiency of energy transfer to your sample plus automatic self correction
- Powerful multi-tasking Windows® software
- Thermostatted optics for unparalleled optical stability
- Sophisticated auto-optimization software
- UV performance provided as standard
- Gratings to cater for the most demanding resolution applications
- Higher productivity with the option to add an extra monochromator
- The capability to handle the most difficult matrices, eliminating the need for dilution

With these features, even first time users can immediately extract the maximum performance from the instrument, regardless of the application. The affordable Integra 6000 offers an ease of instrument set-up and operation.

### The Integra offers the best price/performance ratio for both routine and investigative analysis

The Integra 6000 ICP continues the GBC tradition of spectroscopy products with superior performance that offer better value for money. In achieving this no-compromise objective, our Research and Development team have drawn upon four decades of experience to design an instrument that offers more features, more power and flexibility, and greater performance than higher priced competitive systems.

**ICP users often look at the Plasma to determine quickly whether either the sample has reached the plasma or whether the rinse solution has flushed it out. With an optional Plasma Cam™, the end user can now view this and more from the convenience of the computer screen.**

### Plasma Integrity Protector – PIP™

Plasma Integrity Protector – PIP™ significantly reduces the occurrence of molten torches. Occasionally, under certain conditions, the plasma can collapse and form what is called a parasitic plasma or doughnut. Here the plasma collapses into the top of the torch and if the power to the RF generator is shut no damage occurs. However, if the doughnut is left, such as would happen in an unattended analysis, the torch would melt within a few seconds. GBC has devised and patented the PIP™ which is an option on the Integra 6000. The PIP™ immediately shuts power to the RF Generator as soon as it detects a change from a normal plasma to a parasitic plasma. The occurrence of molten torches are significantly reduced.



## Fast Analysis

# High performance optical system ensures data integrity

### High performance optics satisfy all relevant figures of merit

- Unlimited wavelength selectivity
- High sensitivity
- Highest resolving power
- Unparalleled optical stability
- High stray light rejection
- Auto-optimization of viewing position
- Optimized detector response
- Widest dynamic range
- High productivity
- Unmatched flexibility

The Integra 6000 optics have been designed to satisfy all the fundamental figures of merit critical for spectroscopic instrumentation. We have adopted this no-compromise philosophy to ensure that you have full confidence in the integrity of your data, regardless of your application.

### Huge range of selectable wavelengths

With its comprehensive wavelength database, the Integra 6000 makes wavelength selection simple, displaying relative sensitivities and including positive identification of all potential spectral interferences. Choose the most sensitive wavelengths for trace determinations, less sensitive wavelengths for high concentrations, or the best possible interference-free wavelengths when the complexity of the spectrum generated by your sample matrix demands it.

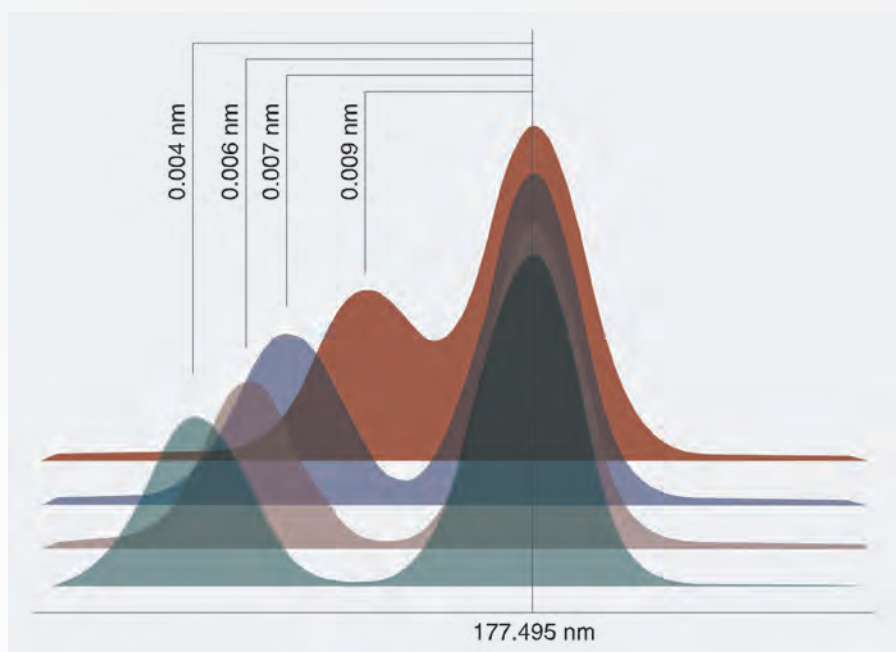
The standard Integra configuration also provides the spectral range to cover all the ICP detectable elements. Integra can measure in the ultra-violet wavelength region where the most sensitive S, P, B, or Al wavelengths are found, right up to the higher visible wavelengths for the analysis of the alkaline metals Li, Na and K.

### Maximum energy throughput for high sensitivity

High sensitivity is ensured by incorporating efficient all-reflective optical components. A minimum of optical components guarantees maximum light throughput.

### Highest resolving power —to 0.004 nm

Choose any one of the range of specialized gratings for the optimum combination of wide wavelength coverage, high sensitivity and high resolving power to satisfy your ICP applications. With as high as 0.004 nm resolution, the Integra 6000 offers the resolving power to perform measurements directly on interference free peaks even in the most demanding matrices. This high resolving power eliminates the need for complex and time consuming mathematical techniques that at best can only provide approximations.



**A choice of gratings provides resolution to 0.004 nm. The example shows a phosphorous line at 177.495 nm resolved from a copper line at 177.482 nm**

## Unparalleled Optical Stability

# High stability and wide dynamic range

### Unparalleled optical stability

The highest possible analytical accuracy and precision is achieved through precise temperature control of the 0.75 m Czerny Turner monochromator. The elimination of drift caused by variations in ambient temperature ensures the integrity of analytical data, even during long and unattended overnight runs.

### High stray light rejection—test it with 10,000 ppm Ca solutions

The Integra 6000 optics achieves outstanding stray light performance through the combination of detectors and gratings offering high performance stray light characteristics.

### Auto-optimization of viewing position—up to 10 fold enhancement in sensitivity

With the intensity of the emission of individual wavelengths varying according to the observed region in the plasma, independent computer-controlled optimization of each element guarantees that maximum sensitivity is achieved for all elements in your sample.

### Optimized detector response—dual detection system

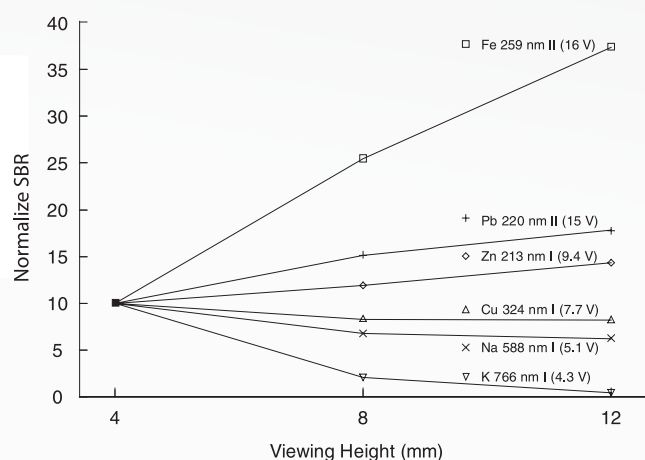
Integra's dual detector system ensures that full peak sensitivity is maintained over the full wavelength range, with a solar blind detector employed for optimum response below 300 nm and a broad range detector optimized for higher wavelengths.

### Widest dynamic range—up to eight orders of magnitude

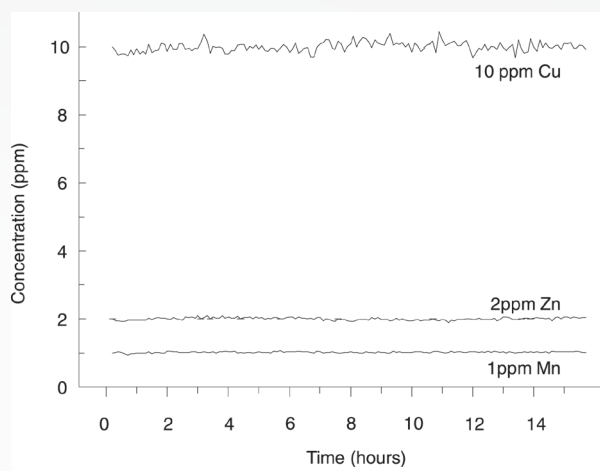
Eight orders of linear response achieved by the dual detector system permits determinations over the widest concentration ranges. Measure concentrations from high percentage levels down to low parts per billion levels in the same sample, without dilution.

### Lowest argon consumption

The total argon flow is typically less than 11 L/min for aqueous samples. This will result in significant Argon savings each year.



Normalized SBR versus viewing height illustrates the benefit of optimization for each element in your sample



Sample concentrations plotted over fourteen hours in a non-airconditioned room demonstrate the superb stability of the Integra 6000

## Outstanding Long-term Precision

# Mass flow controllers provide precision, accuracy and stability

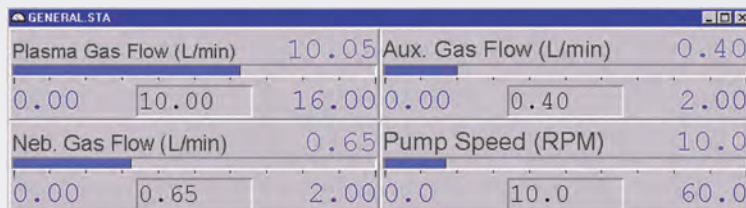
### Innovative mass flow technology provides precise control, ensuring outstanding long-term precision

GBC engineered mass flow controllers, fitted to the sample gas line and optionally to each of the plasma and auxiliary gas lines, guarantee the highest level of precision and control. This unique feature ensures precision, accuracy and reproducibility of signal measurement, essential since analyte intensities are highly sensitive to fluctuations in gas flows.

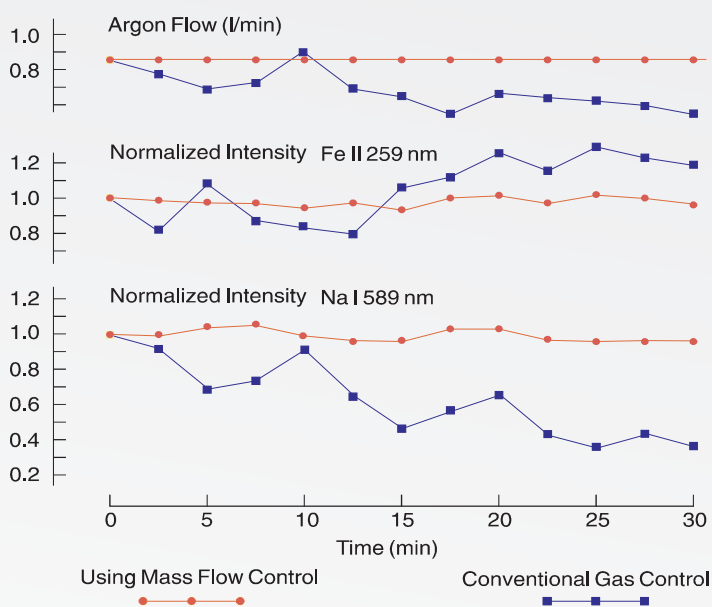
With gas flow rates reproducibly set and maintained to within 0.001 L/min and using GBC's high precision concentric nebulizer and efficient cyclonic spray chamber, Integra routinely achieves an analytical precision of better than 0.5%.

### Excellent long-term stability

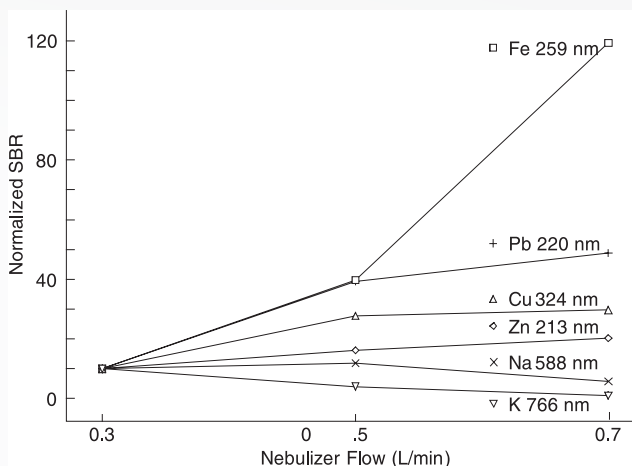
Direct comparison with conventional gas control systems proves that mass flow controllers achieve the highest degree of gas flow control, resulting in the best possible precision, long-term stability and outstanding reproducibility. With typically less than 1% drift over a four hour period, more time can be spent analyzing samples and less time spent repeating calibration standards.



### On-screen monitoring of critical instrument parameters



### Exceptional stability and precision achieved with mass flow control compared to conventional gas control



With sample gas flow individually optimized for each element, highest sensitivities can be achieved even with difficult matrices

## Robust Plasma Across Power Range

# Robust and reliable high efficiency plasma module

### A high stability 1500 watt RF generator ensures high data precision and a robust plasma across the whole power range

Crucial to Integra's power and performance is a robust and reliable 40.68 MHz free-running 1500 watt RF generator. Utilizing highly accurate fuzzy logic controllers, the GBC designed RF system provides unsurpassed

analytical performance. Offering superb stability, the higher frequency also provides reduced background levels for enhanced signal to noise response.

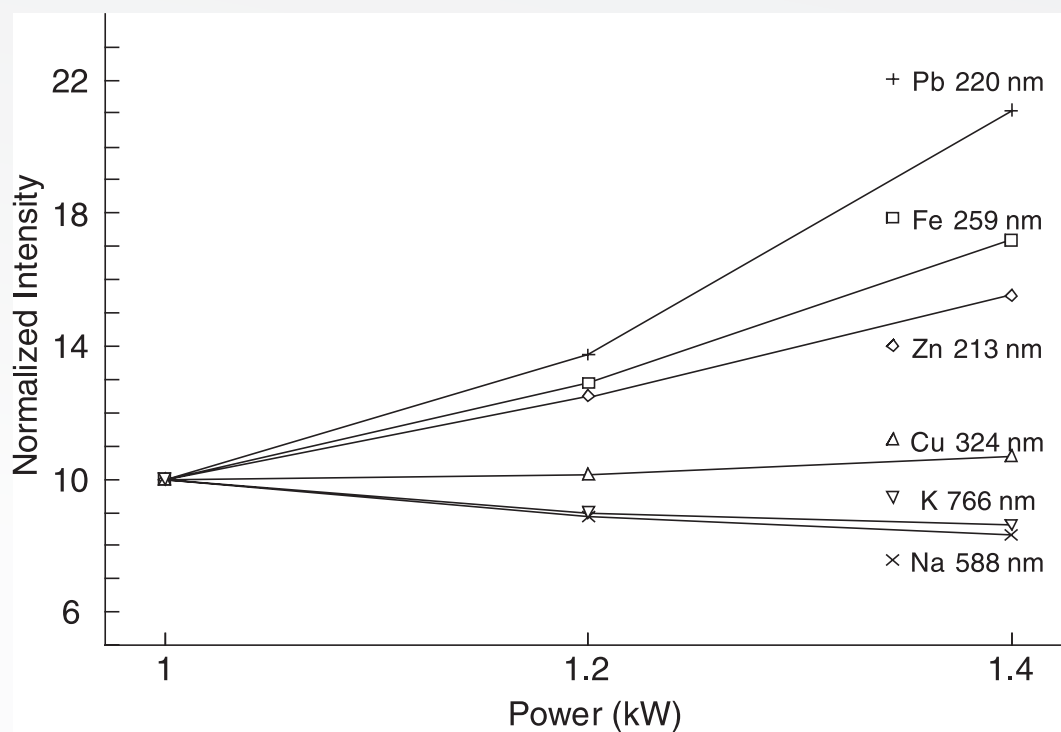
### Optimize power levels for individual elements to increase sensitivity up to ten times

With power settings controlled in precise steps of 10 watts, the

plasma operating power can easily be configured to suit even the most difficult sample matrices with each element in your sample individually optimized.

### Safety and serviceability

Modular with all serviceable components readily accessible via removable panels or sliding racks, permits rapid troubleshooting.



Normalized intensity versus power for a range of elements demonstrates the value of optimizing power settings for each element in a sample Robust



## Highest Energy Transfer

# Robust and reliable high efficiency plasma module

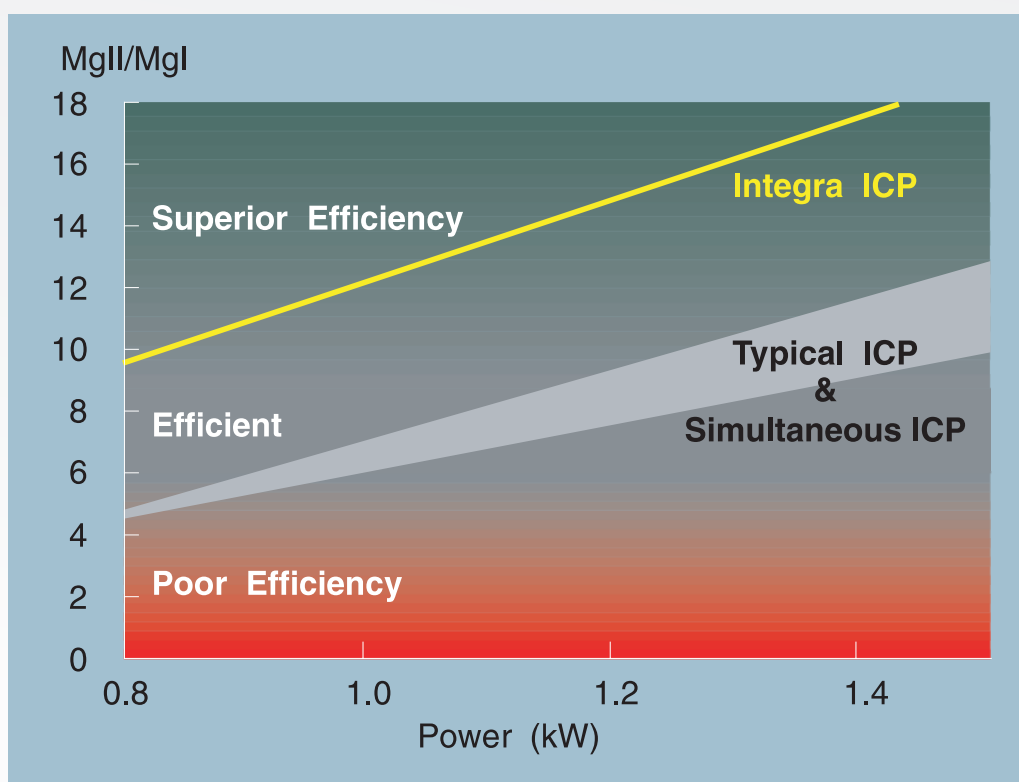
Extensive safety interlocks are incorporated for your protection.

### The highest energy transfer from the plasma to your sample

The Mg II 280.270 nm/Mg I 285.213 nm intensity ratio provides a true measure of the efficiency of energy transfer from the plasma to the sample.

Professor J. M. Mermet has established that values better than 10 are a measure of superior performance. Integra's 40.68 MHz RF generator, efficient torch design and precise control of plasma parameters all combine to provide the highest possible energy transfer from the plasma to your sample. With values typically exceeding 14, Integra has the most robust plasma available ensuring maximum

sensitivity and minimized matrix effects even with difficult organic matrices. This provides the capability to directly analyse even the most volatile of organic solvents without the need to perform any dilutions.



MgII/MgI intensity ratio is a true measure of plasma energy transfer efficiency Highest

## Easy To Use Software

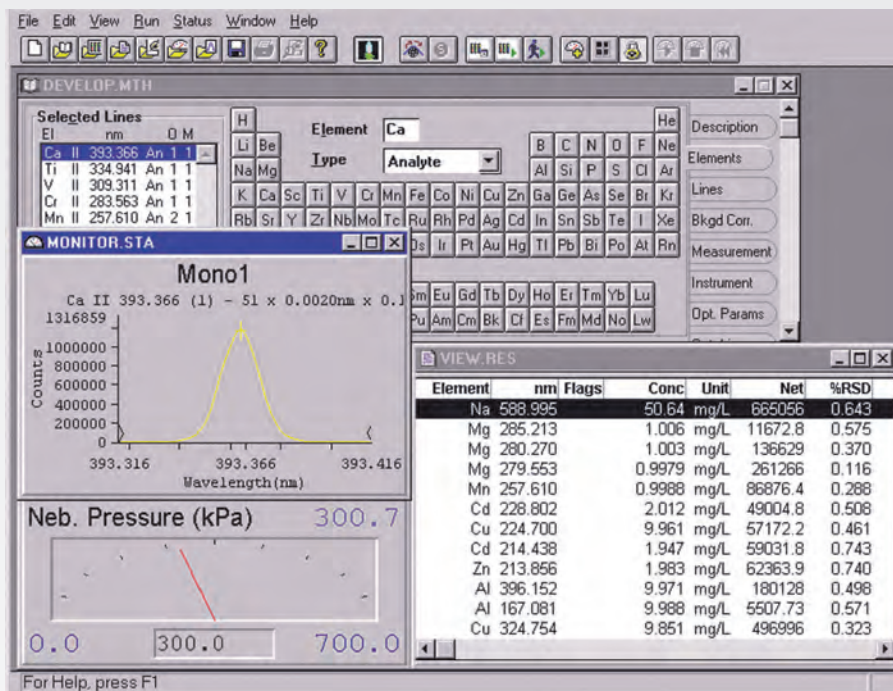
# Powerful software for Windows® combines an intuitive graphical interface with full instrument control

## Power and flexibility—the hallmark of GBC software

GBC has established a worldwide reputation for superior instrument software. The software follows a tradition of inherent simplicity, power and flexibility which have become the hallmark of all GBC software. Utilizing the powerful multi-tasking environment of Windows®, the Integra 6000 user interface provides the ideal combination of features for the experienced user, and the simplicity of point and click analysis for the new operator.

## Multi-tasking enhances productivity

The Integra software also offers powerful 64-bit pre-emptive multi-tasking capabilities. Whichever operating environment best suits your needs, your computer no longer needs to be tied up whilst your ICP is analysing your samples. Enhance the productivity of your laboratory by developing new methods, reviewing old data, generating customized reports, monitoring instrument parameters or even talking to third party software packages during the long periods of sample analysis.



As an example of multi-tasking capability, you can develop or run a Method, monitor instrument Status and view Results simultaneously

## Integra software is easy to use

The Integra ICP software interface is logically organized into modules for simplified central control of all instrument functions. Designed for ease of use and flexibility, the software uses a combination of

key controls, simple-to-edit menus and a notebook style layout to keep you in control and organized. With context sensitive Help only a key press away and error-sensitive screen prompts ready to respond, the Integra software truly is easy-to-use.

## Powerful Graphics Module

# Powerful software for Windows®

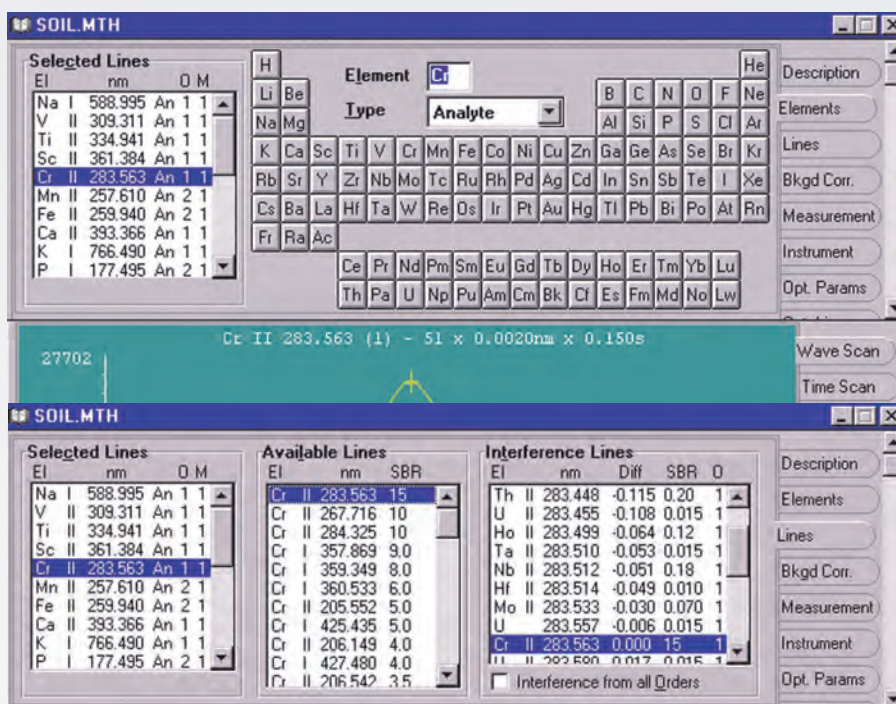
### Method development—an essential task simplified

The notebook style user interface employed in the Method module provides easy access to all the necessary method parameters. Method parameters are sensibly grouped on individual pages of this virtual notebook, and are accessed via appropriately named tabs on the side of each page. This makes method development intuitive even for first time users. The Method module provides all the necessary development tools. Click on the Periodic Table to quickly select the required elements.

### Powerful graphics module

Use the powerful graphics module to display and overlay wavelength scans for investigating potential interferences, defining background correction positions or for determining the effect on intensity caused by a change in any one of the plasma operating parameters.

Alternatively, you can use the chart recorder facilities to investigate performance trends when optimizing, to monitor the stability of your instrument or the stability of specific instrument parameters, or to



### Simplified wavelength selection with detailed spectral line information

determine spray chamber washout times so that you can set and store the appropriate rinse time.

### Comprehensive wavelength library

Direct access to Integra's built-in wavelength library provides information on relative line sensitivities, background equivalent

concentrations and/or potential interferences on over 30,000 wavelengths. With the graphical display of both the origin and magnitude of potential spectral interferences available at all times, wavelength selection becomes simple, even for complex matrices.

## Superior Optimization

# Advanced software capabilities include fully automated instrument control

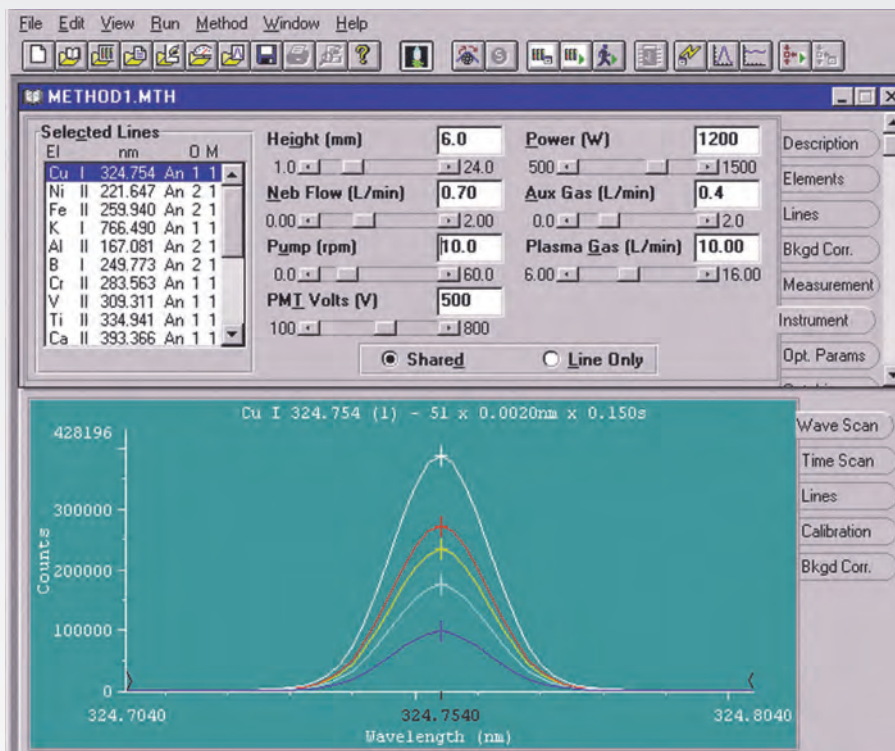
### Total instrument control—store optimized operating conditions for individual elements

Most users of ICP instrumentation take advantage of the multi-element capability of the technique but totally overlook the fact that any measurement performed under a single set of operating conditions results in significant compromises in analytical performance. Some sensitivity compromises can be as high as a factor of 100 but are typically a factor of ten. As with any other technique, ICP requires optimization of its operating parameters to achieve maximum performance. The only way to achieve true maximum performance for all the elements in your application is to optimize each element separately through direct control of the full range of instrument parameters on the Instrument Control page.

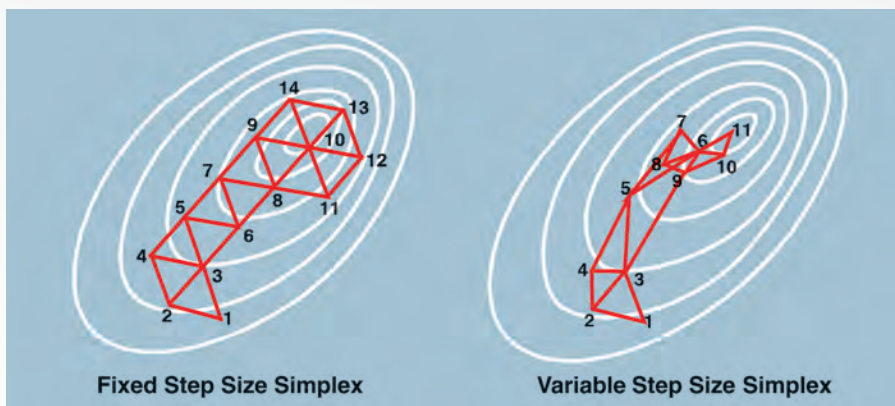
Use the powerful wavelength scan or chart recorder facilities to obtain at least a ten-fold enhancement in sensitivity. Store sets of optimized operating conditions for each wavelength in your application. These sets of parameters can then be recalled with full confidence that they will be reproducibly set. Essential for trace level analysis or research applications, no other ICP offers this capability.

### Simplex optimization

A simplex is a standard mathematical procedure for determining optimum values for a range of inter-dependent parameters. The standard fixed step size simplex is limited in speed and accuracy. A variable step size simplex provides faster and more accurate optimization.



Visualize the effect of parameter settings on line sensitivity



Integra utilizes a variable step size simplex algorithm for faster and more accurate optimization of instrument parameters

## Auto-optimize Methods

# Maximize performance for every application with automatic optimization

### Powerful, multivariate auto-optimization

For less experienced users, Integra provides an intelligent auto-optimization software package that simplifies the once complex task of setting up instrument operating parameters optimized for individual applications. There is no need to understand the complex fashion of how all the operating parameters interact with each other. There is no need to predict the effect on sensitivity on selected wavelengths as the operating conditions are changed. Integra's auto-optimization software will perform all the measurements and calculations automatically according to your selected optimization criteria.

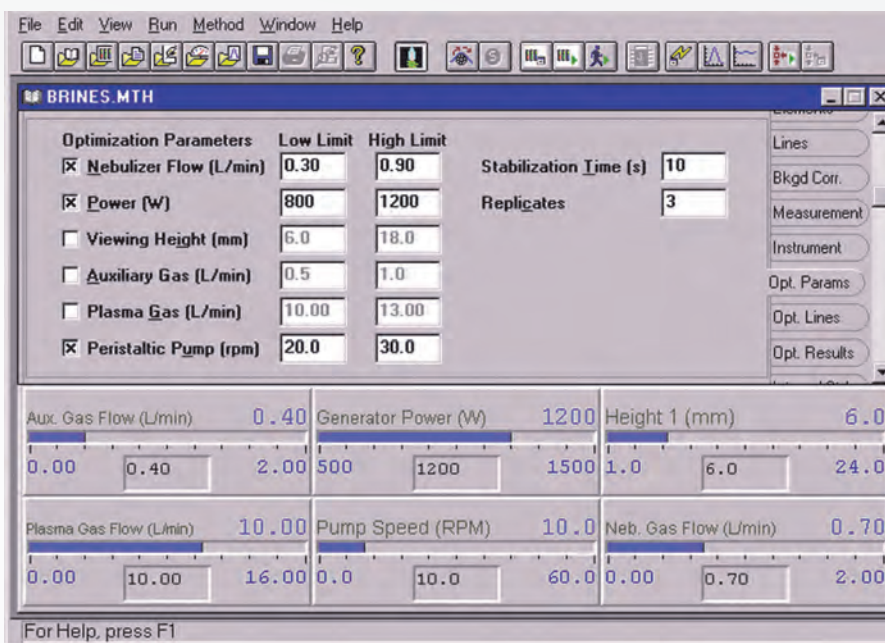
The auto-optimization software package utilizes a GBC modified Simplex mode of multivariate optimization. Using variable step-sizes as opposed to the traditional fixed step-size approach ensures that the true optimization value on the response curve is obtained precisely and quickly.

### User-selectable optimization criteria

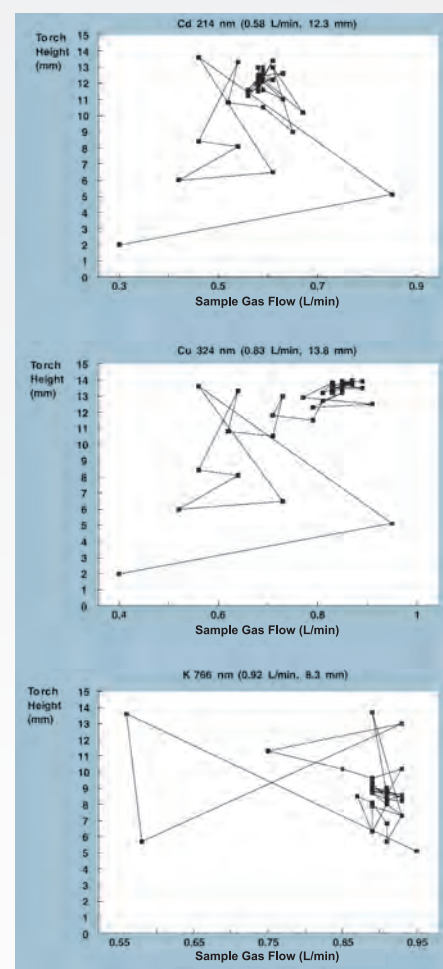
Integra software achieves optimization with any number of variables, according to user-selected optimization criteria, (e.g., optimize BEC, DL, SBR or by intensity or matrix effects). Critical parameters include RF power coupled to the plasma, the

gas flow through the nebulizer, the torch gas flow rates (auxiliary and plasma), the viewing or observation height (and centre for torch alignment) and the sample aspiration rate. Each plays an important role in achieving the highest possible analytical precision, accuracy and sensitivity.

Integra 6000 takes the guesswork out of parameter setting and turns inexperienced operators into expert analysts.



### Auto-optimize individual methods



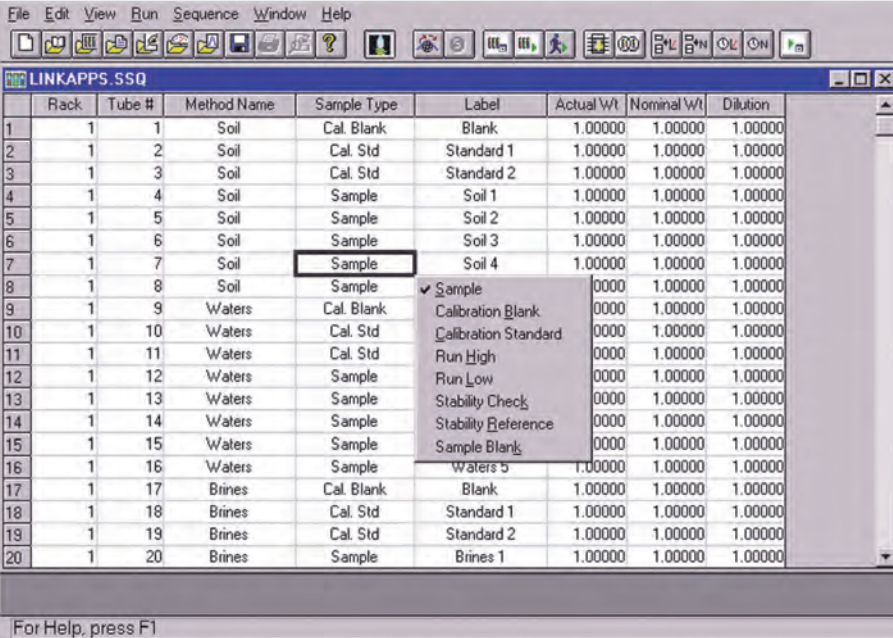
Auto-optimize individual elements. Note that the optimum torch height and sample gas flow are different for each element

## Automatic Data Verification

# Complete unattended overnight operation, plus powerful results and reporting functions

### Dynamic sample sequences – linking multiple applications

The extensive spreadsheet format of the sample sequencing table allows you to rapidly define the sample analysis sequence as setup in your auto sampler. The many spreadsheet setup tools available in the Integra software will help you to quickly insert sample batches, recalibration standards or quality control solutions at your desired frequency. But perhaps the most powerful feature of this simple spreadsheet format is the ability to link multiple applications, ensuring that you take full advantage of Integra's automation.



	Rack	Tube #	Method Name	Sample Type	Label	Actual Wt	Nominal Wt	Dilution
1	1	1	Soil	Cal. Blank	Blank	1.00000	1.00000	1.00000
2	1	2	Soil	Cal. Std	Standard 1	1.00000	1.00000	1.00000
3	1	3	Soil	Cal. Std	Standard 2	1.00000	1.00000	1.00000
4	1	4	Soil	Sample	Soil 1	1.00000	1.00000	1.00000
5	1	5	Soil	Sample	Soil 2	1.00000	1.00000	1.00000
6	1	6	Soil	Sample	Soil 3	1.00000	1.00000	1.00000
7	1	7	Soil	Sample	Soil 4	1.00000	1.00000	1.00000
8	1	8	Soil	Sample	Sample	0.0000	1.00000	1.00000
9	1	9	Waters	Cal. Blank	Calibration Blank	0.0000	1.00000	1.00000
10	1	10	Waters	Cal. Std	Calibration Standard	0.0000	1.00000	1.00000
11	1	11	Waters	Cal. Std	Run High	0.0000	1.00000	1.00000
12	1	12	Waters	Sample	Run Low	0.0000	1.00000	1.00000
13	1	13	Waters	Sample	Stability Check	0.0000	1.00000	1.00000
14	1	14	Waters	Sample	Stability Reference	0.0000	1.00000	1.00000
15	1	15	Waters	Sample	Sample Blank	0.0000	1.00000	1.00000
16	1	16	Waters	Sample	Waters 5	1.00000	1.00000	1.00000
17	1	17	Brines	Cal. Blank	Blank	1.00000	1.00000	1.00000
18	1	18	Brines	Cal. Std	Standard 1	1.00000	1.00000	1.00000
19	1	19	Brines	Cal. Std	Standard 2	1.00000	1.00000	1.00000
20	1	20	Brines	Sample	Brines 1	1.00000	1.00000	1.00000

### Automated data verification routines

Data integrity is assured through automatic periodic testing of check samples against user defined limits. Fail actions include automatic recalibration and continued analysis, thereby utilizing the maximum amount of available time. The automatic plasma shutdown option at the completion of a run allows economical, unattended overnight operation.

### Semi-quantitative determinations

Use Integra's semi-quantitative analysis mode to screen completely unknown samples for the full range of ICP elements within minutes. The semi-quantitative mode can easily be configured to scan any suite of elements for rapid confirmation of the composition of your samples.

Linking multiple applications maximizes the potential of unattended operation

### Advanced engineering and extensive diagnostics mean dependable performance

The powerful instrument diagnostics module offering computer control and monitoring of over 200 instrument parameters can easily be customized for displaying and storing away the parameters that are of most interest to you. Even the display mode is customizable, and includes the option to display your selected parameters as either bar meters, dial meters, text meters, switches or charts.

### Automatic saving of analytical data

Integra assures the security of your data by automatically saving all analytical results generated during an unattended, automatic run. The stored data, including individual wavelength scans, can be reviewed at any time through Integra's Results module.

### Simple data exporting

Validated data can be exported directly to commercial third party packages, such as spreadsheets for graphical presentation, and word processors for generating customized reports.

## Fit A Second Optical System

# High productivity and unmatched flexibility with the most powerful ICP available – the dual optics Integra 6000

**With the capability of fitting a second optical system, the Integra 6000 becomes the most powerful and cost effective ICP available**

The Integra 6000 dual optics system achieves:

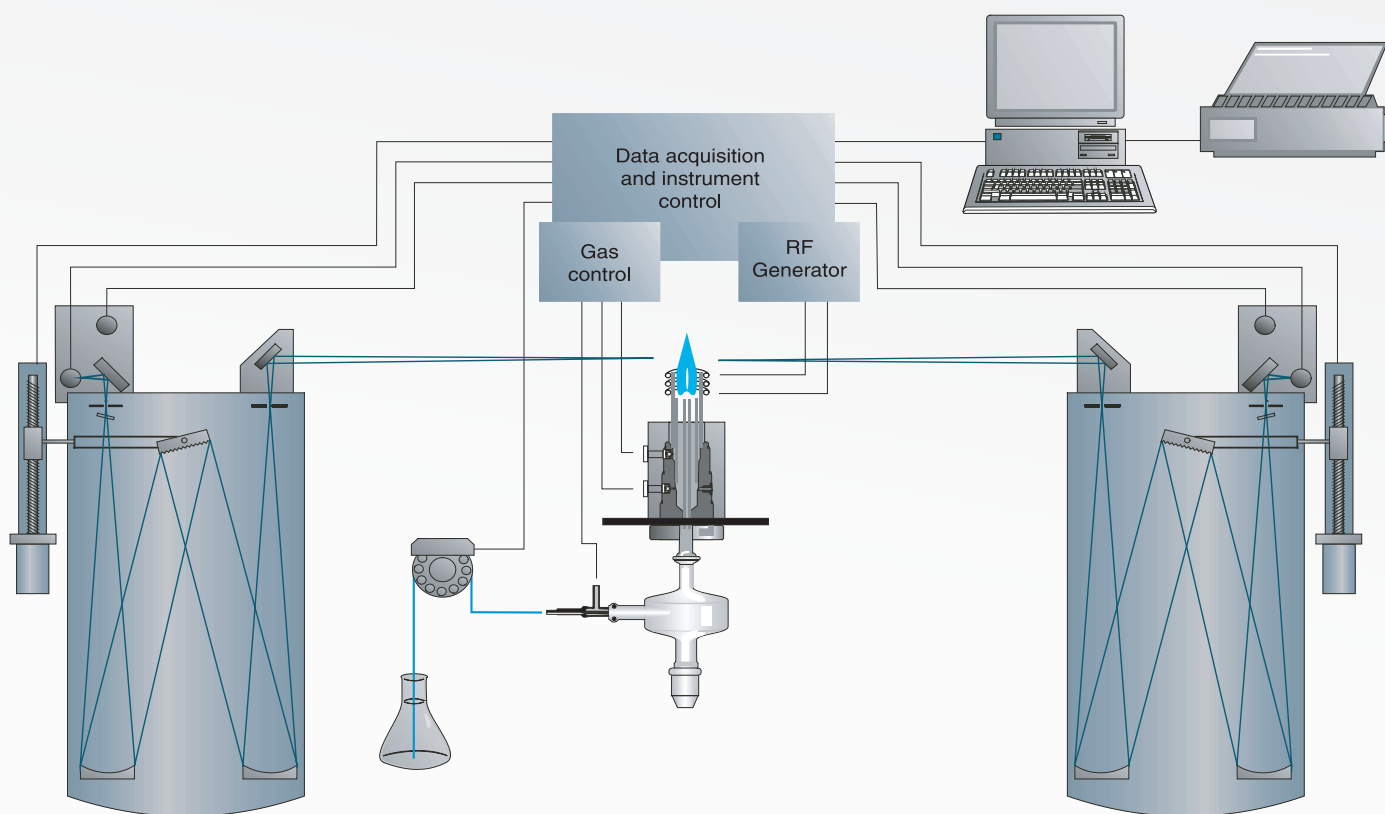
- Double the productivity through simultaneous data acquisition and processing for each optical system
- The capability of two ICPs for a much lower price

- A further significant cost reduction by halving the argon consumption for each sample
- The greatest flexibility with the option to select the highest resolution gratings for specialized applications

## GBC Superdrive for fast and precise wavelength measurement

Among the innovative features of the Integra 6000 is the radically new wavelength drive designed and patented by GBC.

Utilizing the unique spherical coupling, the self-calibrating Superdrive offers superior reliability and repeatability. Combined with the direct-drive refractor plate mechanism, the Integra 6000 offers the highest mechanical precision for fast, accurate and reproducible measurements performed directly on the peak maximum.



**Dual monochromators operate simultaneously for high sample throughput, or use alternative gratings for maximum flexibility**

## Extend the Integra's Capabilities

# A full range of sampling accessories

### SDS3000 Auto Sampler

The SDS3000 is a precision engineered X-Y-Z auto sampler. Designed and fabricated by GBC Scientific Equipment, this affordable auto sampler provides accurate and fast analysis due to its durable, reliable and sturdy design. Supplied with four sample racks to hold 240 sample vials each of approximately 14 mL and a standards rack to hold 10 standard vials plus a blank each with a volume of approximately 50 mL. PTFE and PEEK material is used to provide a metal free liquid flow path. Variable continuous flow sample probe rinse station with peristaltic pump minimizes sample contamination and carryover. Software controls include rinse time, delay time, number of replicates, rescale rate, recalibration rate, measurement time and analysis order. Full random access capability is standard. Up to 360 samples can be loaded using 7 mL tubes.



**The SDS3000 auto sampler provides for fully automated unattended analysis**

### HG3000PII Hydride Generator

Use the HG3000PII hydride generator for the determination of sub parts per billion of hydride forming elements such as As, Hg, Sb, Se, Pb, Bi, Sn, Ge and Te. The HG3000PII hydride generator accessory incorporates precision glassware for highly efficient mixing of reactants and gas liquid separation to ensure reproducibility and high sensitivity. This easy to use accessory takes less than a minute to interchange from the Integra standard set of sample introduction components and is totally made from inert polypropylene material for long lasting performance, essential in highly corrosive environments.



**The HG3000PII continuous vapour generator extends the capabilities of the ICP for the hydride forming elements**



**The precisely engineered gas/liquid separator is the heart of the HG3000PII, ensuring an even vapour flow without pulsation**



## Multiple Spray Chamber Configurations

# Interchangeable glassware and nebulizers for every application

### Programmable Temperature Spray Chamber

The programmable temperature spray chamber (PTSC) features electronically controlled temperature using an inbuilt peltier device.

The PTSC provides all the benefits of a temperature controlled ICP sample introduction system in a compact, convenient, cost effective package. Any temperature between  $-10^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$  can be selected to achieve optimum conditions for any application.

For maximum convenience the PTSC can be controlled from a PC either through supplied Bluetooth interface or supplied USB interface. The cyclonic spray chamber is encapsulated in a special heat conducting polymer which provides excellent sensitivity and precision with fast washout.

- The temperature can be set as low as  $-10^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$  can be selected to achieve optimum conditions for any application.
- By holding the spray chamber at a stable temperature, the long-term stability is improved.
- The sensitivity of many analyses is enhanced by running the spray chamber at elevated temperatures, particularly important for samples with limited volume.



**Programmable temperature spray chamber**

### HF-resistant sampling accessories

For samples digested in hydrofluoric acid, a polypropylene spray chamber, used in conjunction with a ceramic nebulizer and torch sample tube, provides an inert environment for sample introduction. This system can also be used for aqueous samples without compromise.



**HF-resistant spray chamber, used in conjunction with ceramic sample tube and V-groove nebulizer provides a glass-free sample path for silica-based samples**

### Ultrasonic Nebulizer

The combination of high nebulisation efficiency and subsequent desolvation by the ultrasonic nebulizer results in sensitivities typically 5 to 20 fold greater than those achieved by conventional pneumatic type nebulizers. Setup is rapid, taking less than one minute to interchange from the Integra's standard set of sample introduction components and operation is simplified with automatic temperature control of the heating and cooling functions. The compact design allows you to conveniently place the ultrasonic nebulizer on Integra's standard built-in bench, ensuring optimum use of your laboratory space.

An ultrasonic nebulizer is also available for use with organic samples.



**Extended outer tube for the Integra torch, shown here with standard glassware**

## Precision Components

# Sample introduction components provide high sensitivity, stability and tolerance of difficult matrices

### Reaching new levels of detection

The Integra's standard set of sample introduction components offer unique capabilities that overcome traditional limitations. Geared directly at satisfying the end user's applications requirements, innovations in sample introduction design have made the Integra the only ICP able to perform direct determinations on the toughest matrices such as 40% salt solutions and suspensions of milk powders. With the elimination of dilution and digestion steps, the Integra offers the lowest detection levels possible in the toughest samples whilst eliminating unproductive sample preparation procedures.

### Integra precision components

Integra's standard glass concentric nebulizer, typically used for detection limit work, offers a rugged performance with the ability to handle the toughest of matrices. You can even run up to 40% salts with high reproducibility over extended periods without fear of blocking up. Slotting directly into the standard

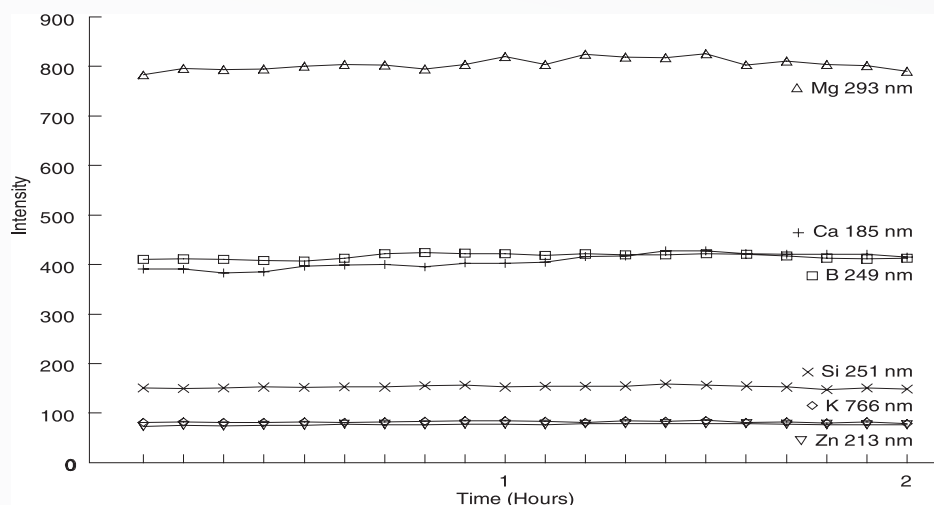
glass cyclonic spray chamber, the concentric nebulizer is readily interchangeable with the optional ceramic V-groove nebulizer.

### Efficient demountable torch

The unique GBC demountable torch provides efficient, cost effective operation offering high performance at reduced powers and gas flows. The push mount torch design requires absolutely no re-alignment when replacing individual components. With gas flows and power reproducibly set and maintained, and using GBC's high precision concentric nebulizer and efficient cyclonic spray chamber, Integra routinely achieves an analytical precision of better than 0.5%.

### Spacious sample introduction area

Integra's spacious sample introduction area allows convenient access to all sample introduction components. With quick release gas connections and hoses, changeover is rapid and efficient, taking only a matter of minutes.



**30% brine solution shows excellent reproducibility over two hours using standard sample introduction components**

## Excellent Specifications

# Integra 6000 specifications

### Optical system

Fully thermostatted, shock mounted 0.75 m Czerny-Turner monochromator with nitrogen purged optics. Capability for direct on-peak measurement. Dual monochromator system is available as an option.

#### Wavelength range

160–800 nm for 1800 g/mm

holographic grating

160–640 nm for 2400 g/mm

holographic (optional) grating

Grating	Order	Resolution (nm)
1800 g/mm holographic	4	0.006
	3	0.007
	2	0.009
	1	0.018
2400 g/mm holographic (optional)	3	0.004
	2	0.007
	1	0.013

#### Typical resolution

##### Optical detector

Dual photomultiplier system employing a R7154 solar blind tube for UV detection and a R928 wide band tube for the visible region.

#### Wavelength calibration

Characterize the full wavelength range with up to 60 argon lines.

#### Viewing position

Computer controlled adjustment. Vertical range: 20 mm above coil.

### Sample introduction

#### Nebulizer

Concentric glass nebulizer as standard. Optional inert ceramic V-groove HF-resistant or Ultrasonic nebulizers available.

#### Spray chamber

Glass cyclonic spray chamber as standard. Optional inert HF-resistant polypropylene version available.

Optional jacketed spray chamber for direct aspiration of highly volatile organics.

#### Torch

Low flow, low power, demountable quartz torch.

#### Argon flows

Mass flow regulation on Nebulizer Gas (optional mass flow control on Plasma and Auxiliary Gas).

All gas flows under computer control.

Plasma Gas: 10 L/min (typical)

Auxiliary Gas: 0.5 L/min (typical)

Nebulizer Gas: 0.5 L/min (typical)

#### Peristaltic pump

Computer-controlled dual channel 12-roller pump, at 0–50 rpm. Four channel option for auto sampler rinse, hydride generator or ultrasonic nebulizer. Auto fast pump setting for rapid washout.

### Software

#### Type

Multi-tasking Windows® based software providing full control over all instrument functions, data collection and processing.

#### Storage capacity

Unlimited wavelengths per application. Unlimited application storage, including sample batches and wavelength scans.

#### Analysis modes

Automatic, Manual, Semi-quantitative, Auto-optimization.

#### Software modules

Methods, Dynamic sequences, Results viewer, Instrument diagnostics, Report generation. Colour graphics Save and retrieve scans, overlay, autoscale.

#### Wavelength database

Built-in wavelength database includes expected detection limits and potential interfering lines.

#### Parameter control

Computer control of viewing height, viewing centre, power, plasma, auxiliary and nebulizer gas flows, periscope purge, pump speed, integration time, scan window, grating order, PMT voltage. Customizable instrument status display.

#### Correction modes

Fixed point or dynamic background correction. Internal standardization. Inter-element correction.

#### Automatic run options

Automatic plasma shutdown. Automatic saving of all data. Stability check testing.

## Integra 6000 Specifications

### RF generator

Free-running, air-cooled generator. Auto-start from switch or keyboard.

### Operating frequency

40.68 MHz

### RF power

Computer-controlled from 600 W to 1500 W with auto-tuning.

### Water-cooled coil

An internal recirculating coolant system is standard.

### Safety interlocks

Interlocks on plasma compartment door, gas pressure, low/high mains voltage, plasma failure.

### EMC standards

Meets the following EMC standards:  
EN61326-1:2013

### Operating voltage

220–240 V AC  $\pm 10\%$ , 3.5 kVA, 20 A

### Frequency

50/60 Hz

### Outlets

Built-in mains voltage outlets for computer and accessories.

### Dimensions

1240 x 1155 x 1600 (WxDxH, mm)

### Weight

500 kg (600 kg packed)

## Accessories

- 99-0697-00 SDS3000 Auto Sampler
- 99-0126-03 Hydride Generator
- 40-0254-00 Programmable Temperature Spray Chamber
- 99-0322-00 Ultrasonic Nebulizer, 220 V
- 99-0323-00 Ultrasonic Nebulizer, 110 V
- 99-0566-00 Ultrasonic Nebulizer with Desolvator, 220 V
- 99-0567-00 Ultrasonic Nebulizer with Desolvator, 110 V
- 97-3786-00 PIP™
- 40-0182-00 2,400 l/mm High Resolution/Sensitivity Grating
- 95-0558-00 3 Channel Mass Flow Controller
- 97-1929-00 4 Channel Peristaltic Pump
- 97-2279-00 HF Sample Introduction Kit
- 95-0035-00 Organic Samples Kit

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GBC SCIENTIFIC EQUIPMENT  
Manufacturer of world-class scientific instruments and accessories  
— AAS, HPLC, ICP-OES, ICP-TOFMS, Rheometry, UV-Vis and XRD

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