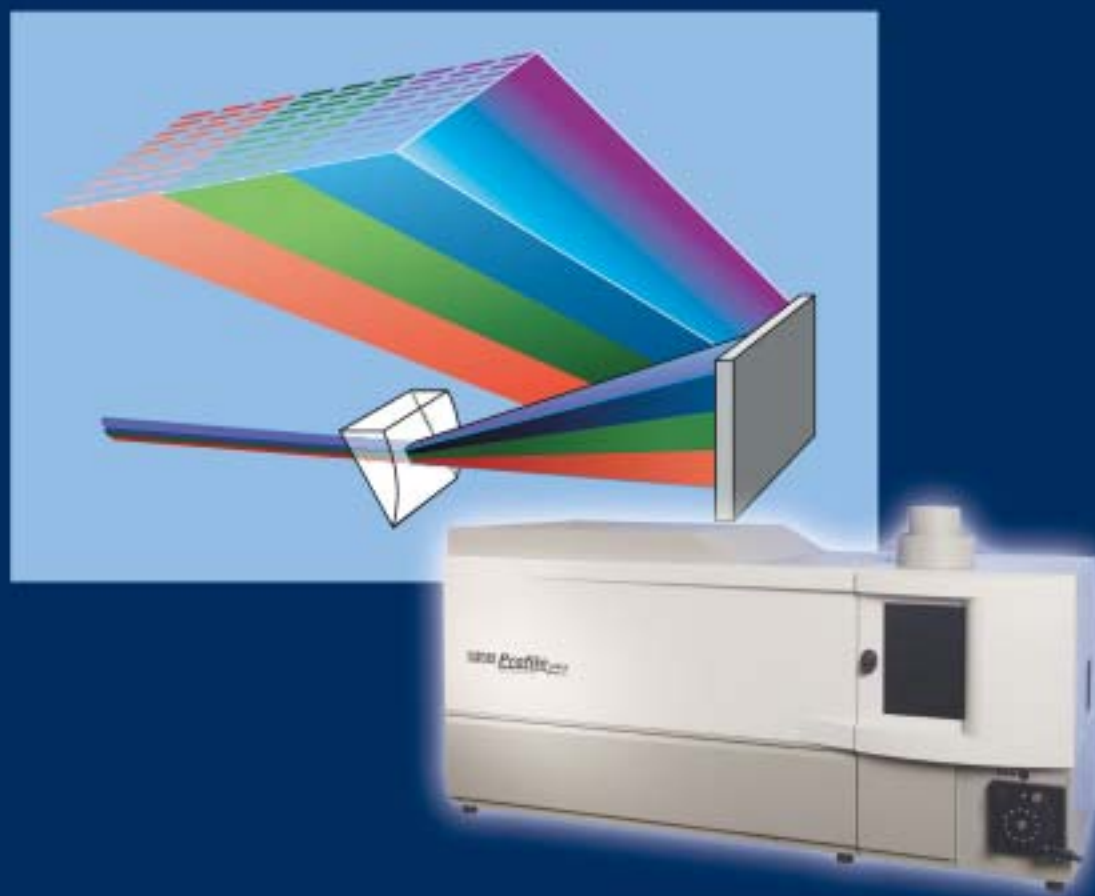


**LEEMAN  
LABS, INC**

# **Profile** *plus*

**High Dispersion ICP**



**Solutions for Elemental Analysis**

# The Profile Family of ICP Spectrometers . . .

Profile represents a new level of achievement in the design of ICP spectrometers. An analytical system so refined that it makes ICP simple and very fast. A system that simplifies your application while solving your analytical problems, rather than becoming one. A system that becomes a laboratory workhorse, not a research project.

In the tradition of Leeman Labs, Profile pays appropriate attention to the fundamental requirements of optical emission spectroscopy so that you can concentrate on your analytical task and not the peculiarities of the instrument. Profile encompasses a family of products including sequential, simultaneous and combination detection systems.

## Versatile Design

Profile is the most versatile family of ICPs in the industry and can be configured for any application or sample throughput requirement.

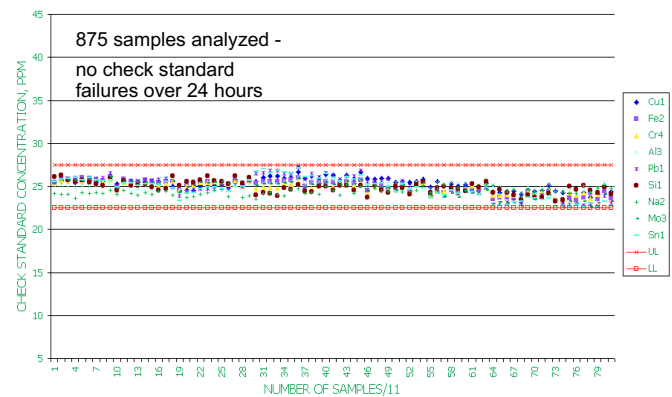
## Need flexibility?

The Profile's any wavelength sequential is the system of choice. All internal optical components are stationary, resulting in extremely stable spectral output. With this patented design, the Profile's detector is moved at very high speed from the center of one wavelength to the next (on-peak integration) without the need for unreliable "Peak Search" routines that are necessary in conventional sequential spectrometers. As a result, low concentrations and complex samples are easy because the location of the analyte peak is known before the analysis is carried out; the Profile is never tricked into measuring the wrong line. And because Profile never has to look for a peak, your analysis is fast - up to three times faster - than with scanning sequential systems. Profile's time is spent measuring peaks, not searching to find them. And compared to CCD based sequential ICPs, the Profile provides up to four times the analysis speed and has fewer interferences.

## Need High Sample Throughput?

A Profile-HT/HP (High Throughput/High Performance) is the solution. Using the same optics as our sequential, the Multi-channel Profile-HT/HP is the highest resolution benchtop simultaneous available. Coupled with high gain detectors and compact size, the Profile-HT/HP assures you of very fast sample throughput and superior stability to maximize your productivity. With the ability to analyze up to two samples/minute, the HT/HP system can easily handle the sample load of any laboratory.

CHECK STANDARD RECOVERY  
WEAR METALS IN OIL HIGH PERFORMANCE SYSTEM



High sample throughput is only possible when matched with high stability. Profile allows you to spend more time running samples, not wasting time re-running calibrations and check standards.

## Need It All?

The answer is the Profile-C. With the Multi-channel and Sequential detector options in a single, high resolution optical package, the Profile-C gives you the sample throughput and flexibility needed to handle any analytical challenge. And because both modes use exactly the same optics, precision and detection limits are the same. No compromises, no trade-offs, just the best possible performance of any combination system available.



*The Profile Series ICP*

## ***Upgradability — Designed With Your Future In Mind***

Over time, the needs of any laboratory can change. If ever increasing sample loads, faster turn-around times and more one-of-a-kind sample types are your expectations, then Profile makes them possible. With our unique design, any Profile can be upgraded to meet your new requirements. Sequential to multi-channel and Multi-channel to combina-

tion upgrade paths are available. Get as much ICP as you need today without worrying if you'll have enough analytical power down the line. When the time comes, upgrade to what you need when you need it, at your convenience. No other ICP line offers such value, today and in the future.

## High Performance Optics

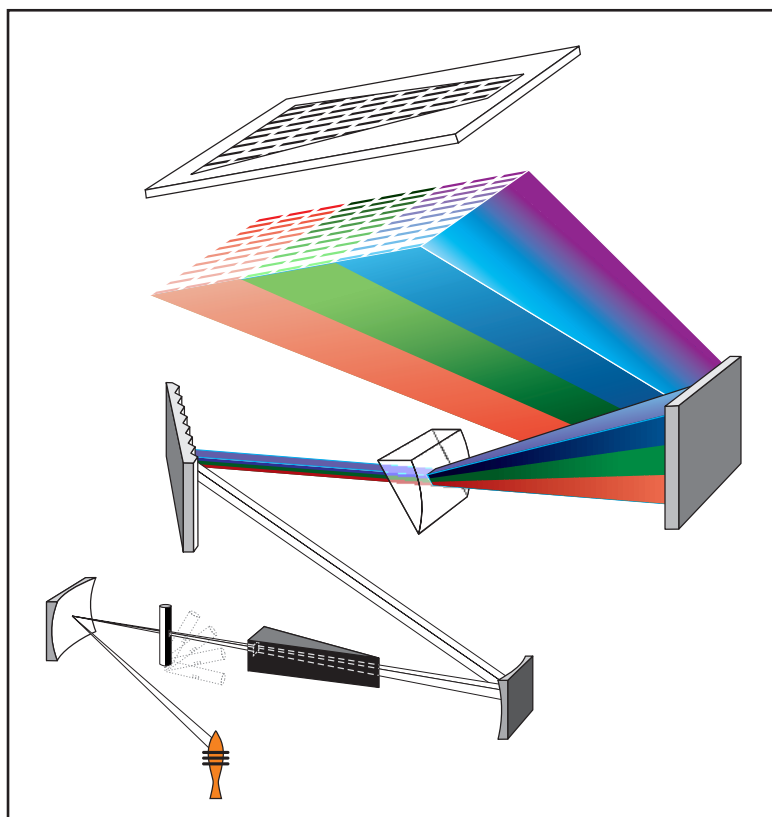
With ICP emission, elemental concentrations are determined by measuring light intensities at discrete wavelengths. Because the ICP is a very high temperature source, it emits many thousands of wavelengths - a “complex spectrum”. The job of the spectrometer’s optics is to make sense of this information and the best way to do this is to use an Echelle optical system with a large output format. In fact, Leeman Labs was the first manufacturer of ICP spectrometers to employ the advantage of the Echelle optical design.

Profile’s Echelle optics disperse the spectrum, widely separating the wavelengths thereby minimizing interferences and the need for interelement corrections. The design also improves resolution - the ability of a spectrometer to distinguish between two closely spaced wavelengths - without reducing the amount of light that gets to the detector. The result is an instrument that can give high resolution and low detection limits at the same time — a feat impossible for conventional and small format echelle designs!

## On-Peak vs. Peak Search

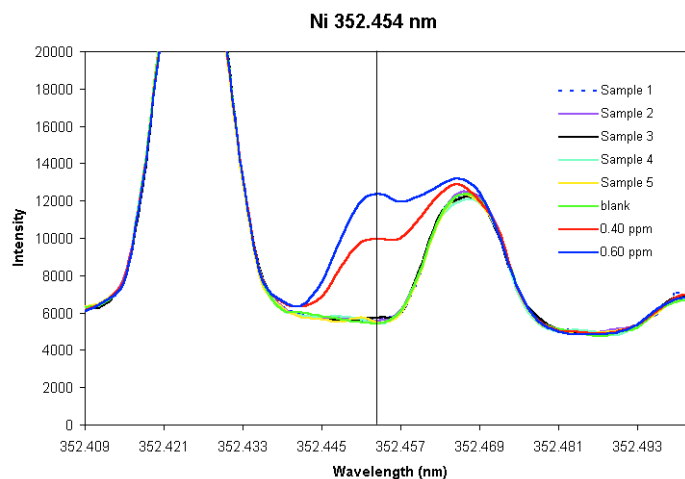
Conventional sequential ICP Spectrometers rotate a grating and carry out a peak search routine to locate the analytical wavelength of interest. As long as there is a single peak in the search window, and the peak is at least 5 times higher than the background intensity, this works well. When the concentration of the analyte is low or the matrix is complicated, accurately locating the peak becomes difficult.

Profile’s patented wavelength selection system accurately moves the detector “On-Peak” to the chosen wavelength,



*The Profile’s design uses fewer optical surfaces, maximizing light throughput for superior detection limits*

without the need for any search routine. Once the detector has arrived at the proper location, all motion is stopped and analytical data are collected. The result is a sequential ICP with the superior accuracy and precision of a simultaneous ICP, even for complex or low concentration samples.



*Profile’s “On-Peak” measurement locates the right peak for every element in every sample regardless of the surrounding spectrum or the concentration of the analyte. This means that you can have complete confidence in your results without the need to use multiple lines.*

*ON-PEAK measurements have significant advantages over systems that employ moving gratings and peak search routines:*

- *Accurately locates a peak even when another peak of greater intensity is present (a peak search locates the peak with the highest intensity, which is not always the correct peak).*
- *Accurately locates a peak that is close to the intensity of the baseline for improved analytical performance near or at the detection limit (peak search algorithms use default locations when analyte intensity is close to the background intensity).*
- *ON-PEAK measurements are three times faster than peak search measurement with multiple readings required for peak definition.*

## **Axial, Radial, or Dual View**

Profile's Echelle design is ideally suited to allow observation of the plasma in the radial, axial, or dual view modes. Its elegant entrance optics provide this flexibility without the need for complex lens/aperture systems, as required by other ICP systems. With Profile, fewer optical surfaces mean more light throughput and therefore lower detection limits.

The traditional radially viewed plasma has a well-deserved reputation for robustness and is still the configuration of choice for many applications. The need for analysts to reach lower levels of detection has resulted in the rapid increase in the popularity of the axially viewed plasma. Providing detection limits that are approximately ten times better than a radial system, the axial plasma has taken ICP into application areas that were previously difficult, if not impossible.

Combining the best features of axial and radial viewing is the dual view system. Capable of running in both radial and axial mode (on an element by element basis in a single method), the dual view is able to analyze virtually any sample for ultra-trace, trace and major elements without the need for multiple sample dilutions.

The Profile combines superb analytical capability, versatility, and performance into an easy-to-use benchtop design.

## **Easy To Use Sample Introduction System**

Traditionally, most operating errors occur in the sample introduction area. The Profile family has a new Auto-Align Torch System that eliminates the guesswork usually encountered when installing torches and spray chambers. Designed with the users' needs in mind, the Auto-Align Torch precisely and reproducibly repositions the torch whenever removal and replacement are needed. Every operator will be able to perfectly position the torch every time; consistently generating high quality results.

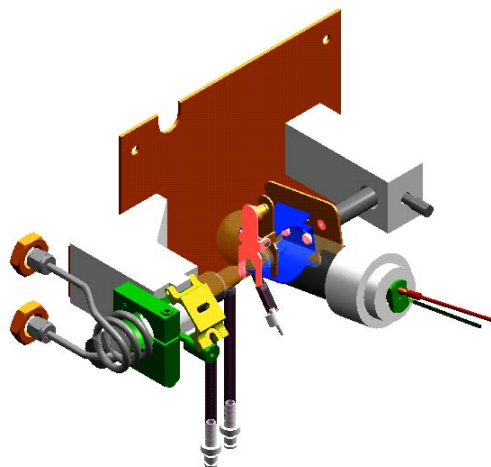
The Auto-Align Torch System makes it easy to configure your Profile to handle even the most difficult analytical applications. A wide selection of sample introduction hardware is available. Cyclonic and HF Resistant spray chambers; torches for aqueous, organic, HF and high dissolved solids applications are easily integrated in the new Auto-Align Torch System.

## **High Efficiency ICP Power Supply**

Incorporated into the Profile is a new, state-of-the-art power supply. Using "Power Factor Correction" technology, this unique system is much more efficient, consuming half the power of traditional designs. Its fast switching ability allows it to regulate the incoming line power more quickly, resulting in outstanding stability without requiring expensive line conditioners. This means faster warm-ups, and superior analytical reliability.

The power supply is built into the body of the instrument, resulting in a compact, benchtop spectrometer. Laboratory space needed for the system is reduced to an absolute minimum.

The Profile uses the Leeman Labs 40.68 MHz free running oscillator for superior tolerance to a wide variety of sample types, including high solids and organics.

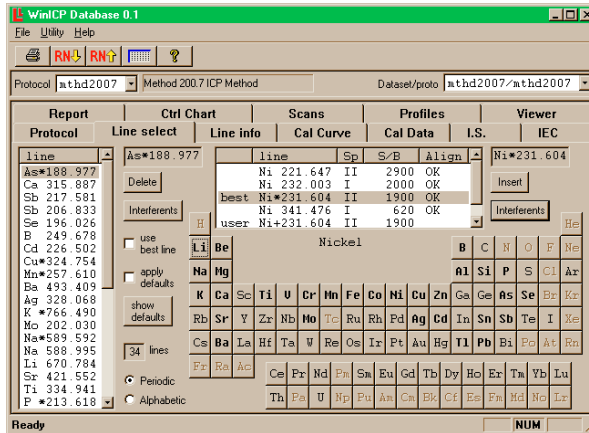


*The Profile Auto-Align Torch System eliminates the guesswork usually encountered when installing torches and spray chambers.*

# Software

Leeman Labs' new WinICP software is designed to fully control the analytical process - from Method Development to Final Report Generation — providing the right amount of flexibility, without the complexity, for every operator. In the routine analytical or research environment, WinICP has the features along with the ease-of-use necessary to get the job done quickly and efficiently. Novice users will be quickly brought up to speed using the audio/visual help environment.

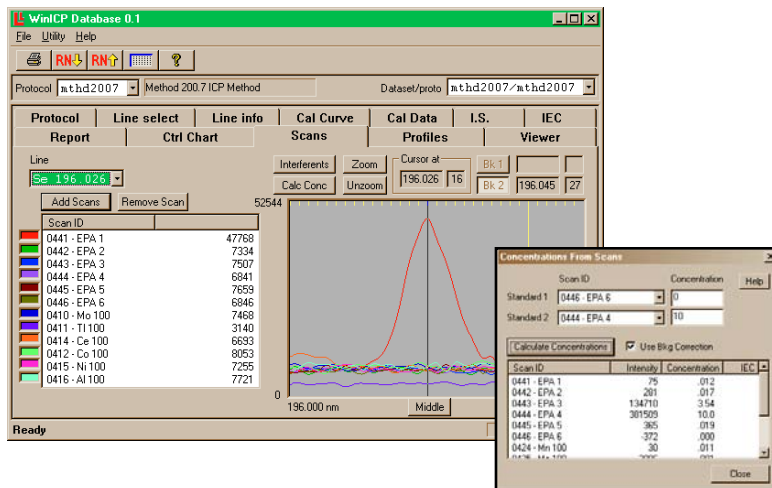
## Element Selection



## Element Selection

Select an element from the periodic chart. Choose the best wavelength from the list or any other wavelength. Use as many (or as few) defaults as you wish to streamline data entry for each element - all standard and check standard concentrations, as well as integration times can be entered with a single button.

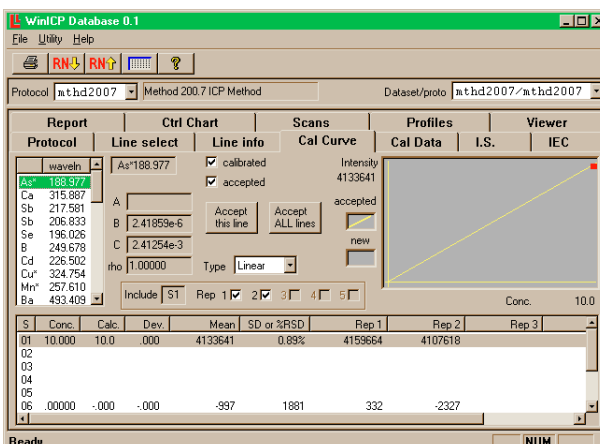
## Scan Page



## Scan Page

Scan the selected wavelength. Then review the signal-to-background, and select the background correction point. Scan a standard and the concentration of samples can be estimated, quickly and efficiently.

## Calibration

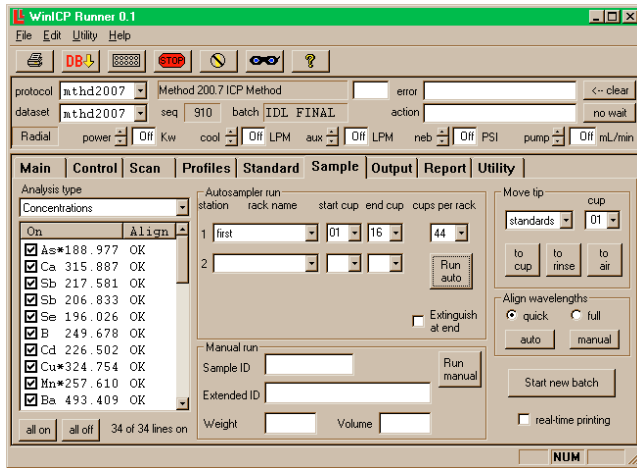


## Calibration

Automatically run a calibration using up to 10 standards and 7 Check Standards by placing the standards into the autosampler and initiating the cycle. Calibration plots can be viewed quickly and easily.

**For more information on Leeman Labs Products and Services, call 1-603-886-8400 or visit [www.LeemanLabs.com](http://www.LeemanLabs.com)**

## Sample Analysis



Select the autosampler rack, the number of samples to be analyzed and the Profile goes to work. WinICP also lets you turn elements on or off without having to open the method.

## QC Reporting



WinICP contains a powerful Control Charting feature. Observe Long and Short QC trends or calculate detection limit data with ease.

## Report Generation

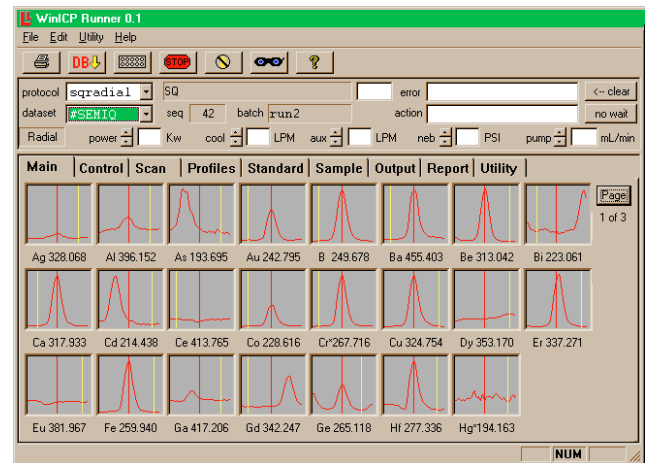
In	Seq	Batch ID
174	bkg=peak	
300	MDL	
311	MDL RUN 2	
322	MDL Day 2	
376	MDL Day 3	
417	IEC Scans	

In	D	Seq	Rec	Record ID
309	PKO	Peak		
310	SMP	MDL		
311	BAT	MDL RUN 2		
312	SMP	MDL		
313	SMP	MDL		
314	SMP	MDL		
315	SMP	MDL		
316	PKO	Peak		
317	SMP	MDL		
318	SMP	MDL		
319	SMP	MDL		
320	SMP	MDL		
321	SMP	SRM 1643c		

Generate reports with as much or as little data as you wish. Take advantage of WinICP's ability to output data in a variety of formats, making compatibility with other software applications straightforward.

## SemiQuant



Determine up to 72 elements in a sample using only a five-element calibration standard. Profile's Direct Reading feature eliminates the need to run multiple wavelengths for each element. Measure concentrations in completely unknown samples with total confidence.

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# Typical Applications

Profile Series ICP—  
The power and flexibility to successfully handle  
the most demanding applications.



## **Environmental**

Drinking Water  
Waste Water  
Ground Water  
Effluents

## **Petroleum Products**

Wear Metals  
Additives  
Crude Oil  
Fuel Oil

## **Food**

Edible Oils  
Dairy Products  
Raw Materials

## **Agriculture**

Soils  
Fertilizers  
Plant Materials

## **Earth and Planetary Science**

Rare Earths  
Fused Minerals Analysis  
Phosphate Rock  
Sediment Extracts  
Silicate Rocks

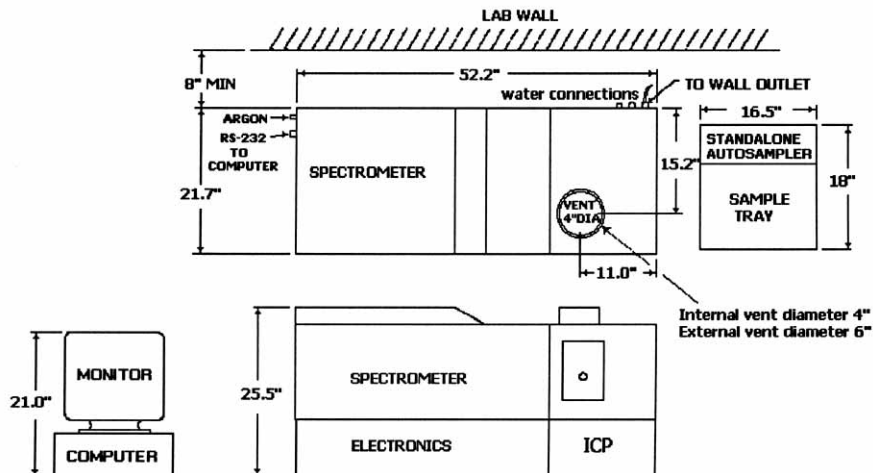
## **Clinical Chemistry**

Blood  
Serum  
Hair  
Urine

## **Industrial Materials**

Cement  
Ceramics  
Catalysts  
Refractories

# PROFILE SPECIFICATIONS



## ICP Site Requirements

Dimensions ..... 52"L x 22"D x 26"H (1326 x 550 x 660 mm).  
 Weight ..... 230 lbs (104 kg).

## Electrical Requirements

Spectrometer/Computer ..... 115V, 15A, 60Hz outlet. (International models vary).  
 Power Supply ..... Grounded single-phase 190-240V, 30A, 50/60Hz  
 (Hubbell receptacle).

## Argon Requirements

ICP Spectrometer ..... 14-20 liters gas per minute.  
 Purge ..... 1.5 liters per minute argon or nitrogen.  
 Venting ..... Minimum air flow 28 liters (100 cfm) per minute.  
 Cooling Water ..... 2 liters (0.5 gallons) per minute, >2.8 bar (40 psi).  
 NOTE: Water recirculator is recommended.



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Solutions for Elemental Analysis



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