

## Elemental Analyzer Quick and Accurate



Simple. Accurate. Unmatched.



### Innovative Quantitative Elemental Analysis

Analyze and quality control your saline solutions, brines, broths, sauces, and many other samples. Determine accurately the concentration of Sodium, Lithium, Boron, Fluorine, Phosphorus, Aluminum and more.

The Turbospec e400 table-top analyzer uses miniature Magnetic Resonance sensors and patented methods to accurately measure the concentration of solutes in a solution. For labs and operations looking for rapid, reliable results, the Turbospec e400 is the most efficient product in the marketplace. Turbospec LLC's proprietary technology and simple operator interface provide superior capabilities and value.

### Remarkably Simple Sample Preparation

Liquid samples such as brines and broths require no preparation. Pipette into a standard 5 mm tube and measure in seconds. For solid samples, water is typically used to extract the element of interest. The results are not affected by interference from other elements in the solution, eliminating the need for sample dilution and extensive filtering.

# Quantitative Elemental Analyzer

## TURBOSPEC e400

Single Touch Operation  
Results in Seconds



## Innovative Methods

### Powerful Analysis Technology

The plug and play Turbospec e400 provides a simple, highly intuitive user interface to determine the concentration of a selected element in seconds.

Turbospec LLC offers product configurations to measure the concentration of up to four elements per unit.

- ✓ Compact and portable
- ✓ Accurate results in seconds
- ✓ No sample preparation
- ✓ Minimal training
- ✓ Minimal maintenance
- ✓ No consumables for rapid ROI

## Specifications

### Single-Touch Configuration

**Size:** 48 cm width, 25 cm height, 25 cm depth

**Weight:** 8.3 Kg

**Power:** input 10 to 28 V DC at 5 A. 110-240 V AC transformer and power cord included

**RFB Radio-Frequency Controller:** single channel broadband ADC reprogrammable system

**Magnet:** ultra-compact permanent magnet array with passive shielding for stray fields

**Touch Screen:** TFT Full VGA high-brightness LCD

**Connectivity:** USB and Ethernet. Remote access via internet

**Temperature of Operation:** 10 C to 50 C – extended-range instruments available as special order

**User Interface:** Graphical User Interface, intuitive operation

**Sample Vial:** standard glass test tube - 5 mm outside diameter, 100 mm length or longer

## TURBOSPEC LLC

Quantitative Elemental Analyzer

Rapid, accurate measurements.



Contact us at [info@turbospecllc.com](mailto:info@turbospecllc.com)

# TURBOSPEC e400 Performance



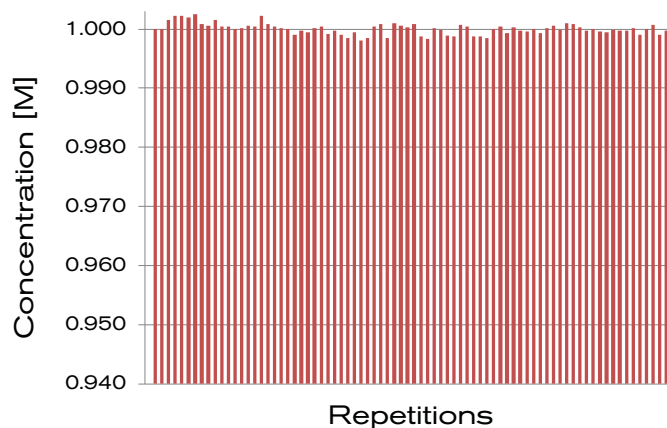
**Methodology.** Turbospec LLC uses proprietary quantitative NMR methods to rapidly and accurately determine the concentration of elements in a solution. The base technology is broadly used in clinical MRI and analytical chemistry. In the Turbospec e400, samples are placed in the strong magnetic field of a compact, permanent magnet. NMR signals are then generated as a response to a series of controlled radio-frequency pulses. The signals penetrate the solution to observe selected atoms - therefore samples don't need to be filtered or diluted. Proprietary quantitative NMR methods are used to provide fast, accurate and repeatable results.

**Advantages.** NMR generates a linear response over an extended concentration range. Therefore, the Turbospec e400 calibration requires a single point. The calibration step and the results are performed in a remarkably short time, less than 1 minute. Most errors associated with sample preparation are eliminated because NMR observes atoms, unaffected by other elements in the solution. There is no need for dilution or filtration - greatly simplifying sample preparation. This is a distinctive advantage over other methods such as titration, ion selective electrodes, conductivity, and atomic absorption spectroscopy.

## Statistics

**Precision & Limit of Quantitation.** The precision or Standard Deviation is in the ppm range for factory settings with elements such as Sodium, Lithium, Fluorine and Boron. From the Limit of Quantitation to saturation, the Turbospec e400 is a highly valuable tool for a wide variety of industrial and analytical applications.

**Accuracy.** The graph shows 80 repeated readings on a 1M Sodium solution. The average concentration measured by the Turbospec e400 is  $C = 1.0001$  M. In accordance with the manufacturer-specified concentration  $C = 1.0000 \pm 0.0001$  M.



## Concentration Units

Turbospec e400 determines the number of atoms per unit of volume. Therefore, the preferred unit is Molarity. The Molarity ( $C[M]$ ) level may be converted to concentration in parts per million ( $C[ppm]$ ) using the equation,

$$C[ppm] = C[M] \times (\text{atomic weight/density of solvent}) \times 1000.$$





# TURBOSPEC e400

By TURBOSPEC LLC

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1



Insert

2



Start

3



Record

Options:  
Add Notes  
Save to Flash