



# Elements

Simultaneous Analysis of Total Sulfur and  
Total Nitrogen in One Single Run



- ⊗ Unrivalled Performance: under 30 ppbw, according to ISO 11843 & Excellent Precision
- ⊗ Robust & reliable: 4 orders of Linear Dynamic Range, Long term Stability
- ⊗ Easiest to use: Easy service access, 10" Touchscreen User Interface & Versatile Software
- ⊗ Spacesaver: Smallest Simultaneous Combustion Analyzer on the Market

## GLOBAL MARKET LEADER FOR ELEMENTAL COMBUSTION ANALYSIS OF TOTAL SULFUR AND TOTAL NITROGEN

PAC ElementS is the most advanced, modular, analytical system available for the detection of Total Nitrogen and/or Total Sulfur content in liquid, gaseous materials and LPG samples. Three configurations are available: ElementS-N for Nitrogen analysis, ElementS-S for Sulfur analysis and ElementS-N/S for simultaneous Nitrogen and Sulfur analysis.

The ElementS analyzer detects these substances through a uniquely efficient process that includes Ultra Violet Fluorescence (UVF) and Chemiluminescence (CLD). The ElementS analyzer combines the testing of Sulfur and Nitrogen for monitoring and protecting key processes in the refining industry.



Figure 1. ElementS Analyzer

## KEY ADVANTAGES

### HIGH PERFORMANCE FOR VERSATILITY AND QUICK ANALYSIS



#### ElementS Analyzes a Wide Application Range all in one Instrument

- Quick analysis of various sample types
- ElementS is able to analyze liquids and gases quickly and accurately
- Long term stability for continuous use

### IMPROVED LAB PRODUCTIVITY THROUGH REDUCED USER INTERVENTION



- Factory tuned analyzer; the instrument is ready for analysis once installed
- With optional customized applications development, operators do not need to spend time to develop methods
- High capacity liquid autosampler (324 samples) reduces need for operators to be present when running samples
- Long term stability reduces calibrations by operators for any measurement range

### PRECISE ANALYZER FOR HIGH QUALITY DATA



#### Application Specific Configuration Provides Excellent Precision

- Dedicated sample analyzer means that your analyzer can truly be optimized for its intended application; can be configured for multiple applications
- PAC application specialists can develop customized methods (no on-site method development needed)
- Factory-tuned analyzer prior to shipment

### PROVEN COMPLIANCY FOR MULTIPLE INDUSTRIES



- Low detection limits ensures regulatory and quality requirements
- Wide application range helps multiple industries meet standards requirements

# ELEMENTS ANALYSIS

## Long Term Stability Test

Sample	# Injections	Results PPM	RSD%
<b>Sulfur Analysis</b>			
Diesel	10	9.44	0.17
E85	10	1.72	1.79
Jet Fuel	10	506.77	0.12
Enhanced Gasoline	10	4.42	0.96
BOB Gasoline	10	2.55	1.24
B7 Diesel	10	9.64	0.27
Jet Fuel	10	167.83	0.08
Heating Oil	10	29.44	0.15
<b>Nitrogen Analysis</b>			
Diesel	10	61.65	0.48
Enhanced Gasoline	10	1.35	1.81
BOB Gasoline	10	1.29	2.75
B7 Diesel	10	39.94	0.92
Heating Oil	10	55.60	0.33

Typical results. Results will vary based on your specific instrument conditions

# ELEMENTS APPLICATIONS

## HPI Applications

### Sulfur Analysis

- LPG
- Condensates
- Naphtha
- Diesel
- Aromatics
- Natural Gas
- Mineral Oil
- Gasoline
- Gaseous Hydrocarbons
- Jet Fuel

### Nitrogen Analysis

- Naphtha
- Condensates
- Distillates
- Oils
- Liquid Hydrocarbons
- LPG
- Light Aromatics
- Lubricating oils

### Methods: Sulfur

- ASTM D5453
- EN ISO 20846
- ASTM D6667
- ASTM D7183
- ASTM D7551
- EN 15486
- IP 490
- JIS K 2541

### Methods: Nitrogen

- ASTM D4629
- ASTM D5176
- ASTM D7184
- DIN 51444
- ISO/TR 11905
- GB/T 17674
- UOP 936
- JIS K 2609

## Non-HPI Applications

### Sulfur Analysis

- Water
- Wastewater
- Ethyl Alcohol

### Nitrogen Analysis

- Water
- Wastewater
- Ethyl Alcohol

10" touchscreen user interface swivels to operate at any position in comfort



Compatible with high-capacity Liquid Autosampler 749



Compatible with PAC Accura for gaseous and LPG samples



Front maintenance door to allow easy access for consumable parts



## SPECIFICATIONS

Ordering Information				
38.00.001	ElemeNtS Combustion Analyzer, Sulfur, 115/230V			
38.00.002	ElemeNtS Combustion Analyzer, Nitrogen, 115/230V			
38.00.003	ElemeNtS Combustion Analyzer, Sulfur + Nitrogen, 115/230V			
Analytical Range	Application Range	LOD¹	Linear Dynamic Range	Repeatability
ElemeNtS Sulfur Analyzer	Low ppb to % level	< 20 ppb	10e4	<1% op 5 ppm
ElemeNtS Nitrogen Analyzer	Low ppb to % level	< 30 ppb	10e3	<1% op 5 ppm
ElemeNtS Sulfur & Nitrogen Analyzer	Low ppb to % level	< 30 ppb		<1% op 5 ppm
Typical Sample Size²				
GAS	10 ml			
LPG	10 ml			
Liquids	20 µl			
Typical Analysis Time				
Gases / Liquids	5 minutes			
Standard Test Methods				
Sulfur	ASTM D5453, EN ISO 20846, ASTM D6667, ASTM D7183, ASTM D7551, EN 15486, IP 490, JIS K 2541			
Nitrogen	ASTM D4629, ASTM D5176, ASTM D7184, DIN 51444, ISO/TR 11905, GB/T 17674, UOP 936, JIS K 2609			
Temperatures				
Combustion Zone	Dual zone Combustion Top temperature typical 950 °C Bottom temperature typical 1050 °C			
Gases				
Dry Oxygen	> 600 ml/min, >5 bar (75 psig), grade 5.0 or better (99.999%)			
Dry carrier (Argon or Helium)	Helium:           > 200 ml/min >5 bar (75 psig), grade 5.0 or better (99.999%)  Argon:           > 200 mL/min >5 bar (75 psig), grade 5.0 or better (99.999%)			
* Helium may be substituted for Argon as a carrier gas (carrier gas adjustment is required)				
Miscellaneous Specifications				
Power	100 - 240 Vac, 50/60 Hz, 1550 VA			
Dimensions (WxDxH)	52.5x55.5x51.5cm, 20.6x21.8x20.2inch			
Weight	41 kg ( 90 lbs)			

NOTE: The above referenced LOD's have been determined using hydrocarbon matrices and optimized instrument configurations with stacked analyses conform ISO 11843. For specific applications, LOD needs to be validated.

## ABOUT PAC

PAC develops advanced instrumentation for lab and process applications based on strong **Analytical Expertise** that ensures **Optimal Performance** for our clients. Our analyzers help our clients meet complex industry challenges by providing a low cost of ownership, safe operation, high performance with fast, accurate, and actionable results, high uptime through reliable instrumentation, and compliance with standard methods.

## HEADQUARTERS

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Our solutions are from industry-leading brands: AC Analytical Controls, Advanced Sensors, Alcor, Antek, Herzog, ISL, Cambridge Viscosity, PSPI, and PetroSpec. We are committed to delivering superior and local customer service worldwide with 16 office locations and a network of over 50 distributors. PAC operates as a unit of Roper Technologies, Inc., a diversified technology company and a constituent of S&P 500, Fortune 1000, and Russell 1000 indices.



Contact us for more details.

Visit our website to find the PAC representative closest to you.

Continuing research and development may result in specifications or appearance changes at any time