



Simple Operation. Complete Analysis.

Combustion & Environmental Analyzers



The New ECA 450 from Bacharach.



We are the Measurable Difference.

Bacharach is committed to making a measurable difference in all that we do. From product development and exceptional service to our nationally recognized Institute of Technical Training, it is our mission to continually deliver beyond what is expected.

Product Leadership Because Bacharach is an industry leader in product development and manufacturing, we are dedicated to incorporating the very latest technology into our instrumentation whenever possible. We work closely with regulatory commissions and professional industry associations to keep abreast of all the latest safety and environmental concerns that may impact the products we design and manufacture. Our goal is to consistently deliver state-of-the-art gas test and measurement instruments and airflow monitoring equipment that are both superior and reliable.

Service Excellence At Bacharach, service means much more than tending to our products after we have manufactured them. It means tending to our customers too. Our global network of service centers allows us to swiftly deliver superior technical service both in the field and in-factory. Communication, speed, availability, expert technical support, on-demand repairs, and outstanding product warranties – all of these things combined enable us to consistently deliver a level of service that is hard to find elsewhere.

Professional Training Sure, instruction manuals have their place. But, Bacharach views professional training as just that – training delivered by professionals. To supplement and enhance the product training our customers regularly receive when they purchase an instrument, we developed our nationally recognized Institute of Technical Training. The Institute offers a variety of comprehensive training seminars on combustion analysis, carbon monoxide safety, building pressure diagnostics, ventilation and refrigeration – all of which are delivered by industry experts. Tens of thousands of professionals across North America have completed our courses and are successfully applying the theories and techniques they acquired from them.

Reliability We view reliability as the total sum of all that we do. Whether it's developing a new and improved measurement device, assisting a contractor over the phone with product questions, encouraging customers to adhere to regular calibration schedules, participating in industry forums to ensure environmental safety, or going that extra mile to turn around a service request in a timely manner – all of these things have contributed to Bacharach's reputation as a consistently reliable company. We're tremendously proud that customers have come to depend on us, and intend to keep winning their confidence each and every day.



Introducing The ECA 450



EPA/ETV Test Verified
Performance

It's like no other industrial grade portable combustion efficiency and environmental analyzer on the market today.

The ECA 450 determines the burner efficiency of furnaces, boilers and other industrial combustion equipment, helping plants reduce fuel costs while determining and monitoring pollutant levels. And it does it with the most user-friendly interface currently available. In fact, no other competitive instrument offers as many features or delivers such sophisticated measurements with such ease.

In addition, the ECA 450 is EPA/ETV test verified for NO_x emissions ensuring more accurate measurements.

So whether you're concerned about combustion efficiency or environmental compliance – or both – the ECA 450 is a simple solution for your sophisticated needs.

Information on the performance characteristics of this technology can be found at www.epa.gov/etv, or call Bacharach, Inc. at 1-800-736-4666 for a copy of the ETV verification report. The use of the ETV® Name or Logo does not imply approval or certification of this product nor does it make any explicit or implied as to product performance.



Delivering Detailed Analysis

Measures

O₂, CO, NO, NO₂, SO₂
Combustibles, Temperature
and Draft

Calculates

Combustion Efficiency
Excess Air
Carbon Dioxide
NO_x

Built-in printer and
custom print-out
capabilities

User Name Line 1	
User Name Line 2	
User Name Line 3	
BACHARACH, INC.	
ECA 450	
SN: EU1165	

Test ID Line 1	
Test ID Line 2	
Test ID Line 3	
TIME	04:27:35 pm
DATE	01/20/2000

FUEL	
Natural Gas	
O2	4.0 %
CO	12 ppm
EFF	82.2 %
CO2	9.5 %
T-STACK	374 °F
T-AIR	68 °F (T)
EA	21 %
NO	18 ppm
NO2	6 ppm
NOX	24 ppm
SO2	1 ppm
HC	0.01 %
CO (3)	13 ppm
NO (3)	19 ppm
NO2 (3)	6 ppm
NOX (3)	25 ppm
SO2 (3)	1 ppm
PRESSURE	-0.04 inwc

COMMENTS:	

EPA/ETV Test Verified Performance



Stores 1,000
test records

Eight hours of
battery life

Modular sensor
compartment

Large vacuum
fluorescent display

Converts to
Pollution Units

"The verification test indicates that the performance of the two Bacharach ECA 450 analyzers was essentially identical in all respects. Unit-to-unit agreement for NO_x from combustion sources was 1.1 to 4.6% and was, in some cases, better than that of the two reference analyzers."

- Quoted from the 2000 EPA/ETV Joint Verification Statement

This innovative combustion efficiency and environmental analyzer conducts accurate combustion and emissions tests that will help you meet environmental regulations and ensure your equipment is burning efficiently. The ECA 450 measures oxygen, carbon monoxide, nitric oxide, nitrogen dioxide and sulfur dioxide, as well as combustibles, temperature and draft. It also calculates combustion efficiency, excess air, carbon dioxide and NO_x.

The ECA 450 takes continuous samplings of furnaces, boilers and other industrial combustion equipment for up to eight hours and generates precise, reliable combustion and environmental measurements and calculations. This detailed, accurate test data can then help you to make more accurate equipment adjustments and better evaluate pollution levels which will improve overall combustion efficiency, reduce fuel costs and determine emissions compliance.



Consider The ECA 450 Difference

Not all combustion efficiency and environmental analyzers are alike. We've designed the ECA 450 to include many distinct features and benefits that competitive instruments don't offer.

Large, Easy-To-Read Data Display Test data are presented on a large vacuum fluorescent display that is incredibly easy to view from any angle. All measured and calculated data are updated on a continuous basis, stored at selected intervals in memory, and presented simultaneously on one data screen. This data can be easily reviewed simply by scrolling down a list. Plus, the display timeout feature, when enabled, will conserve battery life by automatically turning off the display. The ECA 450 will continue to run and take measurements during this period. The display can be re-activated simply by touching any key on the keyboard. The measured data will then be displayed for your review.

Modular Sensor Compartment & Upgrading Capability The ECA 450 features a modular design that allows you to upgrade your unit to include more sensors as your measurement and test data needs grow. Our base unit includes two sensors – one that measures oxygen and another that measures hydrogen compensated carbon monoxide. However, your ECA 450 can be easily and quickly upgraded to include any one or more of the following optional sensors: Carbon Monoxide (high), Nitric Oxide, Nitrogen Dioxide, Sulfur Dioxide, Combustibles.

Carbon Monoxide Hydrogen Compensated Sensor Included in the ECA 450's base unit is a sensor that takes hydrogen compensated carbon monoxide measurements. By including this sensor as standard with the ECA 450, you are assured of more reliable test results.

Combustibles Sensor The ECA 450 also offers an optional sensor that measures combustibles – something that is not available with most competitive instruments. This sensor upgrade enables you to take precise combustibles measurements for more accurate combustion efficiency assessments.

1,000 Data Records The ECA 450 has an enormous data storage capability – allowing you to track up to 1,000 test records. This feature allows you to keep an accurate history of test results by letting you store, download to computer, recall to display and/or print time and date-coded test data for easy reference.

Built-In Printer A printer is built right in to the ECA 450 so that test data can be produced in hard copy form immediately. This unique capability offers you the ability to swiftly reference test results and share them with your customers. It also facilitates quick historical comparisons of data to better assess the performance of equipment over time.



Eight Hours of Battery Life The battery included with the ECA 450 allows for up to eight hours of continuous use. This feature lets you conduct lengthy tests on your equipment in order to more accurately gauge how it is operating during specified test intervals.

All-In-One Product Design Unlike competitive instruments, when you buy the ECA 450 all of the instrument's components are included in one single carrying case. We designed the unit for maximum portability, so that it can be easily transported and set up for smooth, uninterrupted operation.



Why do you need the ECA 450?

The reasons are simple.

Easy Operation The ECA 450 is a microprocessor-based instrument with front panel controls. It's menu driven, but also provides access to any major display screen with just one front panel button push. To facilitate this, Fuel, Pressure, Memory, Setup and Calibration have dedicated buttons. So, no matter where you are in the menu structure, you can access these features simply by pressing a button. Plus, you can set the instrument to be completely customized to your liking. You can get the data you need in a format you want with just a few simple button pushes.

Large, Easy-To-Read Data Display Test data is presented on a large vacuum fluorescent display that is incredibly easy to view from any angle. All measured and calculated data are updated simultaneously and can be reviewed by simply scrolling down a list.

Customized Setups You have the ability to set up your ECA 450 so it provides information in a format that is most convenient for you. A menu guides you through a few simple front panel button pushes that tell the unit what information you want and how you want it displayed. Examples of some of the custom set-ups offered by the ECA 450 include:

- Selectable temperature units (C or F)
- Selectable pressure units (inches, H₂O, mb, Pa, hPa)
- Selectable language (English, French, Spanish)
- Selectable pollution units (ppm, Lb/Mbtu, mg/m³, g/GJ)
- Data display order
- Keypad sound

In addition, both customer information and user information can be cataloged and tracked. This allows you to store test data by customer and keep a running history of it. And at the same time, you can customize customer data print outs with your own company name, address and phone number.

User Selectable Fuels Once the ECA 450 has gone through its warm-up cycle, you can begin to perform tests for any of 10 selectable fuels. You select the fuel, and the instrument will make calculations based on that fuel until another fuel is selected.

Outstanding Performance According to the 2000 EPA/ETV Joint Verification Statement, the ECA 450 offers consistent, reliable test results for NO_x.

"The verification test indicates that the performance of the two Bacharach ECA 450 analyzers was essentially identical in all respects. Unit-to-unit agreement for NO_x from combustion sources was 1.1 to 4.6% and was, in some cases, better than that of the two reference analyzers."

- Quoted from the 2000 EPA/ETV Joint Verification Statement



Software Calibration Calibration adjustments can be made on an as-needed basis, in the field, with a few simple front panel button pushes. Potentiometer adjustment is not required. The calibration mode is password protected so that after the correct password is entered, you can calibrate any combination of the measuring channels. If the calibration is unsuccessful, the instrument will inform you that an improper calibration has been performed and the new settings will not be accepted. The ECA 450 also automatically zeros all sensing channels on ambient air when the instrument is turned on. If a particular sensor is in error during warm-up, the instrument will automatically warn you that a problem exists. Calibration is still recommended every six months – or sooner if necessary. To arrange for this service to be performed in-factory, just place a quick call to Bacharach.

Sensor Maintenance We've designed the ECA 450 so that sensors could be replaced in the field as well. Easy access to the sensor housing is provided through the front panel of the instrument. Most sensors can be removed simply by twisting them out of their bayonet housing. Also, sensor life can be improved by regularly replacing sensor filters.

Memory The ECA 450 has the ability to save up to 1,000 test records in memory. Test records are time and date coded for easy recognition. You can also create information tags that can be attached to the data as it is saved to memory.

Data Logging The ECA 450 also has the ability to log data by interval and duration. The instrument will automatically save records until memory is full.

Printing The ECA 450 can print individual test records, in real time or from memory, to an internal printer.

Downloading The ECA 450 lets you download test data to your personal computer so that you can develop spreadsheet programs.

Who needs the ECA 450?

You do.

The ECA 450 is tailor made for professionals who are responsible for conducting combustion and emissions tests to ensure that furnaces, boilers and other industrial combustion equipment are burning efficiently while environmental regulations are being met.

- Plant maintenance engineers or managers
- Industrial boiler/furnace service technicians
- Energy coordinators
- Compliance officers
- Environmental auditors
- Safety managers



Probes and Accessories

Bacharach offers a variety of sampling probes and accessories to fit your commercial, industrial and environmental measurement and testing needs. All probes and hose assemblies are designed for high accuracy and easy maintenance.

STANDARD SAMPLING PROBE

Features & Benefits

- 12" Probe tube length
- 15' Hose length
- Sample, draft and thermocouple lines included with simple push connectors
- Probe stop cone to seal entry hole and secure probe in place
- Water trap to remove water condensate from gas sample
- Filter assembly to prevent soot from contaminating the analyzer's internal components
- Maximum operating temperature of 1472° F (800° C)
- Optional probe tube lengths of 24" and 36" available
- Optional hose extension, 20' length



Optional high temperature probe



Standard 12" probe and hose assembly

OPTIONAL HIGH TEMPERATURE PROBES

Features & Benefits

- Maximum operating temperature of 2000° F (1093° C)
- Available in 24", 36" and 48" probe tube lengths
- Built-in condensate trap/filter assembly for water condensate removal and debris removal
- Probe stop cone to seal entry hole and secure probe in place
- 15' hose length



Moisture Removal for Comprehensive and Accurate Measurements

Since NO₂ and SO₂ are absorbed by water, effective moisture removal from the sample is of primary importance when obtaining accurate and comprehensive data, especially for emissions testing.



The Compact Conditioner eliminates the need for a heated sampling hose by removing moisture from the gas sample at the probe assembly. After the sample is conditioned, it travels through the hose assembly to the ECA 450 for analysis. In addition to providing highly accurate measurements, the compact conditioner/probe design offers convenience and is easy to use.

COMPACT SAMPLE CONDITIONER

Features & Benefits

- Compact conditioner/probe assembly design
- Peltier chiller to remove water from sample
- Built-in filter section
- Condensate pump
- 12" probe tube length with probe stop cone (standard)
- 15' hose length with sample, draft & temperature lines
- Maximum operating temperature of 1472° F (800° C)
- Optional probe tube lengths available, up to 39"

HEAVY DUTY SAMPLE CONDITIONER

Features & Benefits

- Self-contained and transportable
- Dries and prepares gas sample prior to being analyzed
- Peltier chiller to remove water from sample
- Integral condensate pump
- Filter section
- 12" probe tube length with probe stop cone
- Heated hose with sample, draft and temperature lines, 15' in length
- Maximum operating temperature of 1472° F (800° C)
- Built-in temperature controller
- EPA/ETV Test Verified Performance



ETV ✓

The Heavy Duty Sample Conditioning System includes a heated hose assembly with temperature control to prevent water vapor in the sample from condensing before it reaches the conditioner chiller. The conditioner condenses the water vapor and removes the moisture from the sample. The sample is then supplied to the ECA 450, which provides accurate measured results. The performance of this analyzer combination is EPA/ETV test verified.



Specifications

TECHNICAL DATA		
MEASUREMENTS		
Measurements & Ranges	Oxygen Carbon Monoxide (hydrogen compensated) Carbon Monoxide (high)* Nitric Oxide* Nitrogen Dioxide* Sulfur Dioxide* Combustibles*	0.1 to 20.9% 0 to 4000 ppm (hydrogen compensated) 4001 to 80000 ppm 0 to 3500 ppm 0 to 500 ppm 0 to 4000 ppm 0 to 5.00% (application dependent)
Stack Temperature	-4 to 2400 degrees F (-20 to 1215 °C)	
Primary Temperature	-4 to 999 degrees F (-20 to 999 °C)	
Pressure/Draft	-27.7 to 27.7 inches of H ₂ O	
CALCULATIONS		
Calculations & Ranges	Combustion Efficiency Excess Air Carbon Dioxide (dry basis) NO _x (NO _x = NO + NO ₂) NO _x referenced to % O ₂ CO referenced to % O ₂ NO referenced to % O ₂ NO ₂ referenced to % O ₂ SO _x referenced to % O ₂	0.1 to 100.0% 1.0 to 250% 0 to fuel dependent maximum 0 to 4000 ppm 0 to 17000 ppm 0 to 99999 ppm 0 to 14900 ppm 0 to 2100 ppm 0 to 17000 ppm
ACCURACY		
Accuracy	Oxygen Stack or Flue Gas Temp. Primary-air/ambient Temp. Pressure/Draft CO NO NO ₂ SO ₂ HC	± 0.3% O ₂ on practical concentration of flue gas ± 4°F between 32 and 255°F (± 2°C between 0 and 124°C) ± 6°F between 256 and 480°F (± 3°C between 125 and 249°C) ± 8°F between 481 and 752°F (± 4°C between 250 and 400°C) ± 2°F between 32 and 212°F (± 1°C between 0 and 100°C) ± 2% of reading or ± .02 in wc whichever is greater ± 5% of reading or ± 10 ppm whichever is greater between 0-2000 ppm CO ± 10% of reading between 2001 - 40000 ppm CO ± 5% of reading or ± 5 ppm whichever is greater between 0-2000 ppm NO ± 5% of reading or ± 5 ppm whichever is greater between 0-500 ppm NO ₂ ± 5% of reading or ± 10 ppm whichever is greater between 0-2000 ppm SO ₂ ± 5% of full scale
Selectable Fuels	Natural Gas, Oil #2, Oil #4, Oil #5, Oil #6, Propane, Coal, Wood, Kerosene, Bagasse	
Power	Universal AC adapter and an internal battery pack. Adapter will accept input voltages from 100 to 240V. Fully charged battery pack provides a minimum of 8 hrs of operation	
Pumps & Probe	Two pumps are included. The first pump supplies gas sample to the sensors. The second pump supplies fresh air to purge the low range CO sensor when CO levels exceed 4000 ppm. Probe includes a standard probe and hose assembly equipped with a water trap, particulate filter, probe stop, 15 feet of hose, and 12-inch probe tube.	
Size	13.5"H x 18.5"W x 9"D	
Weight	25 lbs. (11.34 kg.)	
Warranty	1 year, extended warranty available	

See EPA/ETV Joint Verification Statement for test results.

* *Optional*



The analysis is accurate

With the ECA 450, you'll enjoy exceptional performance with remarkable accuracy.

- Oxygen is in the range of: $\pm 0.3\% O_2$ on practical concentration of flue gas
- Stack or Flue gas temperature is in the range of:
32 to 255 °F: $\pm 4^\circ F$ (0 to 124 °C: $\pm 2^\circ C$)
256 to 480 °F: $\pm 6^\circ F$ (125 to 249 °C: $\pm 3^\circ C$)
481 to 752 °F: $\pm 8^\circ F$ (250 to 400 °C: $\pm 4^\circ C$)
- Primary-air/ambient temperature in the range of: 32 to 212 °F: $\pm 2^\circ F$ (0 to 100 °C: $\pm 1^\circ C$)
- Pressure/Draft: $\pm 2\%$ of reading or $\pm .02$ inches H₂O whichever is greater
- CO: $\pm 5\%$ of reading or ± 10 ppm whichever is greater between 0-2000 ppm CO
 $\pm 10\%$ of reading between 2001-40000 ppm CO
- NO: $\pm 5\%$ of reading or ± 5 ppm whichever is greater between 0-2000 ppm NO
- NO₂: $\pm 5\%$ of reading or ± 5 ppm whichever is greater between 0-500 ppm NO₂
- SO₂: $\pm 5\%$ of reading or ± 10 ppm whichever is greater between 0-2000 ppm SO₂
- HC (combustibles): $\pm 5\%$ of full scale

"Drift in zero readings obtained before and after laboratory and combustion source tests was within ± 2 ppm. Span drift was usually less than 1% ..."

-Quoted from the 2000 EPA/ETV Joint Verification Statement

The EPA/ETV verified test results show that the ECA 450 and the Heavy Duty Sample Conditioner System have the best NO_x performance of the tested portable emission analyzers.

ECA 450 MEASUREMENTS		
Sensor	Range	Resolution
Oxygen (O ₂)	0.1 to 20.9%	0.1 %
Carbon Monoxide (CO) hydrogen compensated	0 to 4000 ppm	1 ppm
Carbon Monoxide (CO) (high)	4001 to 80000 ppm	10 ppm
Nitric Oxide (NO)	0 to 3500 ppm	1 ppm
Nitrogen Dioxide (NO ₂)	0 to 500 ppm	1 ppm
Sulfur Dioxide (SO ₂)	0 to 4000 ppm	1 ppm
Combustibles	0 to 5.00 %	0.01%
Stack Temperature	0 to 2400 ° F	1° F
Ambient Temperature	0 to 999 ° F	0.5° F
Pressure / Draft	-27.7 to 27.7 inches of H ₂ O	0.01 inch of H ₂ O

ECA 450 CALCULATIONS		
Combustion		
Calculation	Range	Resolution
Efficiency	0.1 to 100.0 %	0.1 %
Excess Air	1.0 to 250 %	1.0 %
Carbon Dioxide (dry basis)	0.1 to fuel dependent maximum	0.1 %
Pollution		
Calculation	Range	Resolution
Nitrogen Oxides (NO _x = NO + NO ₂)	0 to 4000 ppm	1 ppm
NO _x referenced to %O ₂	0 to 17000 ppm	1 ppm
CO referenced to % O ₂	0 to 99999 ppm	1 ppm
NO referenced to % O ₂	0 to 14900 ppm	1 ppm
NO ₂ referenced to % O ₂	0 to 2100 ppm	1 ppm
SO ₂ referenced to % O ₂	0 to 17000 ppm	1 ppm



With Bacharach, Your Job Is Made Simple

We want to ensure that your overall experience with the ECA 450 – and every product we design and manufacture – is exceptional. To that end, we are committed to supporting you and all of our customers on the back end – after their initial purchase – with ongoing technical training and unparalleled service.

Expert Training

A product that is not properly supported with expert training and instruction will likely yield less than exceptional performance. To Bacharach, this is simply unacceptable. That is why we have gone to great lengths to design professional training programs that support our products – and our customers – over time. Knowing how to use an instrument is one thing. Knowing when and why to use an instrument is something else entirely.

Our Institute of Technical Training offers an array of seminars that address the theories and practices which support the proper and peak performance of our equipment. These courses have gained recognition throughout the US and Canada as some of the best being offered today. Focusing mainly on carbon monoxide and combustion testing training, these four-to-six hour sessions emphasize actual job-related skills – those that have the potential to increase a company's profits and reduce liability. What's more, industry professionals find them worthwhile regardless of their educational background or experience.

Specific course topics include:

Carbon Monoxide Safety – Reviews all currently recommended standards for carbon monoxide in ambient air and flue gas.

Combustion Analysis – Reviews the diagnosis of flue gases from basic theory to manufacturers' suggested measurements.

Venting & Combustion – Reviews vent identification and compliance specifications.

Building Pressure Diagnostics – Offers a comparison of competing measurable pressures within a structure as well as exhaust fan influences.

All four seminars are conducted throughout the year in major cities across the US and Canada. Each attendee receives a four-course training manual (valued at \$90), four to six registered hours of instruction and a certificate of attendance. Attendees may also be eligible for Continuing Education Units (CEUs) because these seminars are accredited by many cities, states, and professional associations.

Because Bacharach is the leading manufacturer of environmental monitoring and combustion testing instruments, our technical training seminars are the most advanced and comprehensive available. We have educated over 12,000 technicians, contractors, inspectors, and safety personnel in a wide variety of industries all across North America.



Exceptional Service

We stand behind our products with a broad service offering designed to support our products and provide a sense of security for our customers – long after the initial equipment purchase has been made.

Our service offering includes a global network of service centers that are staffed with field service engineers who can deliver on-site technical support to customers with more complex service requirements. These centers are also equipped to conduct product inspections, as well as on-demand repair services. (For the service center location serving you, please refer to the back inside cover of this brochure.)

Calibration service for your ECA 450, and for other Bacharach instruments, can be conducted at your nearest Bacharach Service Center as well. However, the ECA 450 – like many of our other instruments – can be calibrated in the field at your facility as long as you have the necessary equipment and qualified personnel to perform the required calibration procedures.

Bacharach's technical support staff is also available by phone, 24-hours a day, seven days a week, ready to assist you with any questions you may have.

Our commitment to you is to answer your servicing needs with speed, quality and professional consideration. To that end, we recognize the importance of a timely response to service requests, and have made a two-day turn-around for most in-factory repairs our corporate goal.

Our service operation also works proactively with customers, by providing product-oriented operations and maintenance training, and by notifying customers of regular maintenance schedules to help ensure the continued safe operation and optimum performance of Bacharach equipment.

Offering exceptional service is one of Bacharach's core values. We are confident that your experience with our service operation – long after your initial ECA 450 purchase is made – will be nothing short of excellent.





Ordering Information

PART NO.	DESCRIPTION
24-7221	Base Unit (O ₂ , CO, T _s , T _a , DP)
24-3026	CO (high) Sensor*
24-3027	NO Sensor*
24-3028	Combustible Sensor*
24-3029	NO ₂ Sensor*
24-3030	SO ₂ Sensor* (available only with NO ₂ option)
24-1124	20 ft hose extension
24-3024	24" probe
24-3025	36" probe
24-3035	24" high temperature probe
24-3036	36" high temperature probe
24-3037	48" high temperature probe
24-7223	Heavy duty sample conditioning system (EPA/ETV test verified performance). Includes Peltier chiller unit with integral condensate pump, 15' heated hose assembly with probe and built-in temperature controller.
24-7224	Compact sample conditioner/probe assembly. Includes Peltier chiller/probe assembly, built-in filter, condensate pump and 15' hose assembly.
104-1797	10 ft. Type K TC
104-1799	Type K TC Wand
104-1800	Thermocouple Wand Extension
104-4027	Serial Cable DB.9M to DB.9F
24-0980	Printer Paper (5 rolls)
07-1644	Filter (pkg. of 3)
24-7059	Gas Calibration Kit (does NOT include gas)
24-0492	Cal Gas CO-low (500 ppm)
24-0794	Cal Gas CO + H ₂ -low (500 ppm)
24-1155	Cal Gas CO-high (4000 ppm)
24-1156	Cal Gas NO (250 ppm)
24-1157	Cal Gas NO ₂ (100 ppm)
24-1158	Cal Gas SO ₂ (100 ppm)
51-1121	Cal Gas CH ₄ (2.5%)

**Optional, installed & calibrated*



The ECA 450 has undergone testing administered by an objective third party commissioned by the Environmental Protection Agency (EPA) as part of the Environmental Technology Verification Program®.



Technology Type: Portable Emission Analyzer
Application: Determining Nitrogen Oxides Emissions
Technology Name: Model ECA 450 Portable Emissions Analyzer



The ECA 450 and Heavy Duty Sample Conditioner have been EPA/ETV performance test verified.

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Made in U.S.A.

