El Dorado Engineering, Inc.

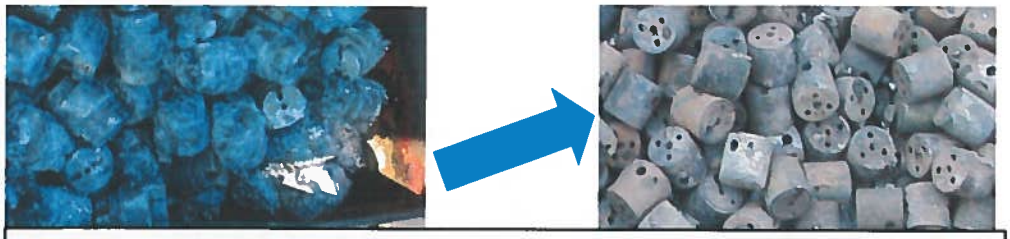
DOD Customers:	JMC & Anniston Army Depot
Project Name:	Transportable Flashing Furnace
Project Location:	Talon, WV
Project Dates:	2008
Client Contact:	Phil Keith, 812-854-6157

Project Summary

This project is very similar to Minden in that a contractor was tasked to dispose of explosive items. The contractor sold some high value materials but improperly stockpiled tons of hazardous explosive material which was never destroyed. Like Minden, the site was abandoned with many tons of explosive materials left in haphazard, unsafe conditions. After spending millions of dollars trying other companies and alternative technologies that failed, the Army turned to EDE to provide the technology that worked to clean up the site.

EDE had previously provided a Transportable Flashing Furnace (TFF) to Anniston Army Depot. EDE was contracted to provide a new, larger TFF for this location to flash explosive contaminated materials from their missile recycling facility. EDE designed, fabricated, and installed a new, larger TFF capable of flashing up to 5,000 pounds per hour of explosive contaminated materials. EDE trained the Anniston operators in the use of this equipment.

The smaller TFF originally used at Anniston was refurbished and sent to West Virginia to be used in the cleanup and restoration of the old Talon site. The furnace was used to process a wide variety of live items including fuses, detonators, leads, etc. EDE was also tasked to provide assistance with explosive chemistry, combustion analyses, and anticipated air emissions used to secure the environmental permits for the operation. EDE also designed and provided strongboxes for the project, installed the furnace, and trained the operators. This operation at Talon was very successful as the Mobile Ammunition Renovation Inspection Demilitarization (MARID) team was able to process the entire workload in less than 6 months by operating two 10-hour shifts per day.



Hazardous materials were safely and successfully thermally treated to remove explosive and toxic hazards resulting in materials which were safe and clean.

El Dorado Engineering, Inc.

DOD Customers:	Belgium Ministry of Defense
Project Name:	Belgium EWI and PAS
Project Location:	Zutendaal, Belgium
Project Dates:	2013
Client Contact:	Pascal Gora, 9-2374-8250

Project Summary

El Dorado Engineering, Inc. (EDE) was selected in an open worldwide competition to provide an Explosive Waste Incinerator (EWI) facility for Belgium Ministry of Defense. The turnkey project included all design, fabrication, installation, training and startup. This included the EWI and an advanced Pollution Abatement System (PAS) to meet European Regulations. The Belgium MOD had a workload consisting of bulk propellant, explosives, and various types of ammunition, some remaining from World War II and earlier.

The PAS was a state-of-the-art facility that not only met the very stringent EU regulations, but also removed NOx to the lowest emissions ever achieved for thermal treatment of propellants and explosives by using an EDE developed system with both NSCR (non-selective catalytic reduction) and SCR (selective catalytic reduction) operating in series. The facility acceptance testing was very successful, including the successful treatment of M6 propellant and red bag packaging at the required throughput rates, while demonstrating emissions which were far below the required standards.

Belgium invited dignitaries from throughout the world to view the system and had a ribbon cutting ceremony in September 2013.

El Dorado Engineering, Inc.

DOD Customers:	Confidential Commercial Client
Project Name:	Commercial Contained Burn Facility
Project Location:	United States
Project Dates:	2013
Client Contact:	Confidential

Project Summary

El Dorado Engineering, Inc. (EDE) was contracted by a confidential client to provide a turnkey Contained Burn Facility to process off-spec energetic materials and explosive contaminated waste products. This facility included the feed system, thermal treatment containment vessel, pollution control system, and controls.

EDE assisted the client in obtaining all environmental permits and approvals required for the construction of the facility. The facility was tested and demonstrated to comply with air emissions restrictions, and feed rate of materials. The facility included a feed system for incremental feeding of energetic items and a separate feed system for explosive contaminated wastes. The pollution abatement system included controlled cooling, a bag house, and HEPA filter that provided absolute complete control of particulate emissions.

El Dorado Engineering, Inc.

DOD Customers:	Huntsville Army corps of Engineers
Project Name:	Contained Burn for RM Propellant
Project Location:	Letterkenny Army Depot, PA
Project Dates:	2015
Client Contact:	Michael Davis, 907-354-2435

Project Summary

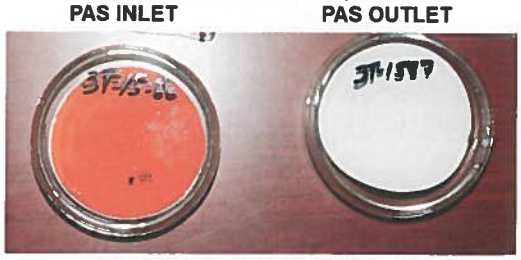
El Dorado Engineering, Inc. (EDE) proposed that contained burning would be an effective and efficient way to demilitarize tactical rocket motors. It was calculated that although it is known that incomplete products of combustion exist at the rocket motor nozzle exit that the combustion could go to completion with entrained air. Firing the rocket motor in a containment vessel allows for capture of all motor exhausts capable of being scrubbed relatively small, highly efficient pollution control system. EDE previously had demonstrated this concept by firing an MLRS rocket motor at Arnold Engineering Development Center in a contained burn rocket test chamber, which handles up to 50,000 pounds per firing cycle. Data was collected for designing a smaller scale containment chamber specific for the MLRS rocket motor.

Based upon this successful testing, EDE was tasked to design and build a first-of-a-kind closed thermal treatment facility for the disposal of a wide variety of tactical rocket motors. This facility is being designed and constructed specifically as a clean alternative to open burning via static firing. The first project task was to perform an evaluation of viable thermal treatment methods. The results of this study selected contained burning as the superior technology. Smaller rockets such as the MLRS are to be fired directly into a firing chamber that will contain the heat and exhausts. After cooling, the exhausts are passed through a pollution control system. Very large rocket motors are segmented, the segments ignited, and the exhausts similarly contained.

The turnkey project consists of all facilities and equipment necessary to process the rocket motors. This includes the loading system, the confined burn thermal treatment chamber, and pollution abatement system (PAS) equipment. Successful full scale demonstration testing was performed at China Lake, CA, as part of this project.

EDE obtained the required environmental permits on behalf of Letterkenny Army Depot. The facility has also received the required DDESB approval. The system is designed for up to 805 lbs. of propellant per batch cycle, with up to three batches per hour. The production facility is under construction with systemization scheduled for Fall of 2015.

Particulate Samples



El Dorado Engineering, Inc.

DOD Customers:	MARID
Project Name:	Transportable Flashing Furnace and PAS
Project Location:	Mcalester, OK
Project Dates:	2010
Client Contact:	Denis Ridpath, 918-420-6099

Project Summary

MARID planned to continue to use the Transportable Flashing Furnace (TFF) manufactured by El Dorado Engineering, Inc. (EDE) for onsite cleanup of explosive wastes on an emergency response basis. Because of concern that the equipment may be required to process materials next to neighborhoods and people, EDE was tasked to design and provide a mobile, trailer mounted air pollution control system so that where required, the transportable furnace could be operated without emitting harmful materials from to the environment.

El Dorado Engineering, Inc.

DOD Customers:	Crane Naval Weapons Center
Project Name:	Magnesium Recovery Pilot Plant (MRPP)
Project Location:	Crane, IN
Project Dates:	2012
Client Contact:	Sara Poehlein, 812-854-3190

Project Summary

El Dorado Engineering, Inc. (EDE) was awarded a series of contracts to provide all necessary services to design, procure and fabricate, and install a pilot plant to recover magnesium from obsolete flares. The recovered magnesium was required to meet the specifications of new material so that it could be used in the Navy's current production. This pilot plant included a waterjet system to washout materials from obsolete flares. The byproducts were then separated from the magnesium by a series of equipment processes and the magnesium was cleaned, classified, dried, and packaged for reuse.

The plant had a state-of-the-art controls system and included all equipment for preparing and manipulating the flares for washout through all downstream processes to high-grade magnesium recovery. This included a material handling system to safely transport and feed flammable flare composition through the process, while mitigating significant flammability hazards associated with these materials. Installation and checkout at Crane Naval Weapons Center was completed in 2012. Demonstration testing was performed on 60 mm, 81 mm, 4.2, and LU-2 flares. The polishing columns were able to achieve 96% magnesium purity for recovery on items that have spherical magnesium and laminate binder. The benefits of this project include a safe and environmentally clean process to dispose of obsolete flares and at the same time recover a highly valuable magnesium material for recycle and reuse.

El Dorado Engineering, Inc.

DOD Customers:	NATO (NAMSA/NSPA)
Project Name:	NATO EWIs
Project Location:	Albania/Ukraine
Project Dates:	2007/ 2011
Client Contact:	Fred Peugeot, 352-3063-5994

Project Summary

El Dorado Engineering, Inc. (EDE) was selected by NATO (NSPA formerly NAMSA) in a worldwide competitive procurements to provide an Explosive Waste Incinerator (EWI) for both Albania (2007) and Ukraine (2011) as part of the Partnership for Peace Program to rid the world of dangerous stockpiles of ammunition.

The project in Elbasan, Albania, included total responsibility to prepare the design, procure and fabricate all equipment, ship the equipment, install the equipment, and train the operators. The EWI is used to dispose of munitions at a very high feed rate with complete pollution control and absolute safety. EDE was awarded this contract based on a competitive bid of international companies to NAMSA. EDE had the most experience of any company bidding in providing ammunition demilitarization equipment of this nature. EDE was able to exceed NAMSA's requirements and still provide the lowest overall bid for the project. EDE effectively used in-country personnel to assist with the program. This was regarded by NAMSA as the "Showcase Humanitarian Project" as the plant completed the ammunition disposal contract ahead of schedule, with more than 23 million pounds processed.

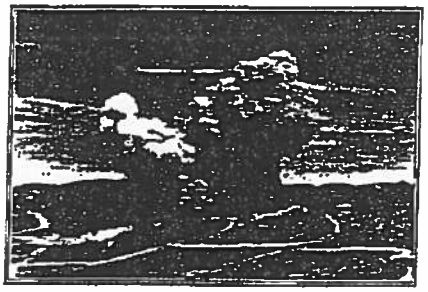
The EWI project in Donetsk, Ukraine, included total responsibility to prepare the design, procure and fabricate all equipment, ship the equipment, install the equipment, and train the operators. The EWI is used to dispose of munitions at a very high feed rate with complete pollution control and absolute safety. EDE was awarded this contract based on a competitive bid of international companies to NAMSA. This facility utilized more advance pollution abatement equipment than required for the prior Albanian project to meet local requirements and handle Eastern Bloc ammunition, which contained Mercury Fulminate primers. Bulk explosives and propellants were successfully processed as part of acceptance testing.

Past Performance and Accolades

EDE's reputation for performance on similar projects is excellent. This is illustrated by EDE having received two Public Service Awards for excellent work on NASA contracts, three outstanding Engineering Awards from the Consulting Engineers Council of Utah, the National Tibbett's Award for outstanding research and development, and numerous letters of commendation from various clients. In the process of reviewing and granting EDE's application for a U.S. Federal General Services Agreement (GSA) engineering services contract, GSA contracted with Dunn & Bradstreet to contact twenty-five of EDE's past clients. These clients rated our performance as excellent.

The Louisiana Military Department can expect this same excellent service on this M-6 and CBI propellant project. Excerpts from Letters of Commendation, a copy of one of EDE's public service awards, and EDE's commendation by Navy Success stories are provided.

NAVY TOPIC: N85-087 (NAVSEA/NSWC)



Rocket plume of space shuttle booster static firing

El Dorado's PCAD computer model helped NASA demonstrate that plumes from the Space Shuttle Booster firings caused no undue public or environmental risk.

SBIR Investment: $500K

Project Revenues: $4.2M

Projected Annual Revenues: $200K

Reducing the Dangers of Smoke & Flame

Products of Combustion/Atmospheric Dispersion, or PCAD, is a computer model that predicts the products of combustion and downwind dispersion from open burning, detonation, or firing of propellants, explosives, pyrotechnics, and rocket motors. To evaluate product formation and dispersion from accidental chemical releases and fires, there is also the Hot Spills computer model that is now available commercially.

Benefits & Applications

- Predicts products of the combustion process, heated plume rise, and subsequent dispersion of the emission products
- Provides risk assessments and analyses for both expected and accidental operations
- Assists in obtaining environmental permits
- Assists by preparing Subpart XEPA Permit for: Tracor Aerospace, Aerojet, Thiokol, Hercules, Rockwell, Martin Marietta, Tracor Aerospace, Atlantic Research Corp., and Ensign-Bickford Corp.

PCAD Site Specific License Purchased By

- U.S. Navy, U.S. Air Force, and U.S. Army Missile Command (including INF Treaty compliance applications)
- NASA (including Cape Canaveral installations)
- British Ministry of Defense
- Canadian Ministry of Defense

El Dorado Engineering, Inc. (EDE)

El Dorado Engineering, Inc. is a leader in the modeling and prediction of plumes and combustion processes. Their expertise has been invaluable to agencies and corporations working to reduce risks and comply with environmental protection regulations. For more information, contact Ralph W. Hayes by e-mail at eldorado50@aol.com or by telephone at (801) 966-8288.

2964 WEST 4700 SOUTH, SUITE 109, SALT LAKE CITY, UTAH 84118

October 28, 2010

Subject : El Dorado Engineering

To Whom it May Concern:

El Dorado Engineering has partnered with ECC over the past several years providing expert design, technical support and engineering services for our demilitarization efforts with our US Department of Defense clients.

We have found them to be a trusted partner, striving to always provide us and our clients with practical solutions to very technical and complex problems relating munitions management and demilitarization.

Their management team and staff are professional, extremely efficient and have been a pleasure to work with both in a roll of support subcontractor and as an integral part of a multidisciplinary project team.

I would recommend them highly in any effort that falls within their expertise and feel confident that they have the knowledge and resources to provide technical, yet common sense solutions.

Sincerely,

Michael Tamburoni
Senior Project Manager
Munitions Response Division
ECC

cc: Richard Davis, Vice President, Munitions Response Division, ECC
Ralph Hayes, President, El Dorado Engineering

Corporate Office
1240 Bayshore Highway
Burlingame, CA 94010
Phone: (650) 347-1555
Fax: (650) 347-8789
www.ecc.net

NATO EXPLOSIVE WASTE INCINERATOR

Barry,

I reviewed your questionnaire and concluded that I do not have time to respond in full - there are too many questions requiring too much information. However, I am happy to report on our experience with El Dorado Engineering (EDE) in general terms.

We have so far purchased 2 EWI's from EDE. We also bought a similar EWI from another supplier, so we can compare these suppliers. By a wide margin, EDE were the best company to deal with. They were at all times prompt, courteous and helpful, qualities that stemmed from the underlying culture of the company. They assisted our customer in Albania to bring the plant into 24/7 operation, in which mode it continued with short breaks for maintenance, for nearly 2 years.

EDE was the best company to deal with. They were at all times prompt, courteous and helpful, qualities that stemmed from the underlying culture of the company.

EDE produced the plant, arranged for its export from USA and import to Albania, coordinated the infrastructure design, supervised the building works and assembly of the plant, trained the operators, commissioned the plant and provided follow on services. They were very professional in all they did.

I hope that helps.

Regards Peter

Peter COURTNEY-GREEN
Chief, Ammunition Support Office, Operational Logistics Support Programme el +352 3063 6449,fax +352 3063 6660
pcourtney-green@namsa.nato.int

TRW

Mr. R. Hayes, President
El Dorado Engineering Co.
2964 West 4700 South, Suite 109
Salt Lake City, Utah 84118

Dear Ralph,

In early June I will be taking a new position within TRW at our electronics facility in Paris, France. This will involve leaving the airbag business and the Mesa Facilities for at least the next year. I will miss the association that I have had with you and your staff in the past, although we certainly have not been too active lately.

I wish to commend you and the staff at El Dorado Engineering for the

> TRW: "The professional and knowledgeable manner in which you worked with TRW and the quality of the design.......... are of the highest caliber..........an easy project to manage........due to the competency of the subcontractor......."

Respectfully,

Michael R. Gardner
Project Manager, TTU Design Project
TRW VSS

MPG95007

GENERAL ATOMICS

Mr. Ralph Hayes
El Dorado Engineering Inc.
2964 West 4700 South, Suite 109
Salt Lake City, UT 84118

Dear Mr. Hayes:

I would like to thank and commend you and your company for your excellent performance in the design and manufacturing of the Explosive Waste Incinerator (EWI) that we recently commissioned in Löben, Germany. We selected your company based on your superior knowledge and capabilities for EWI design, construction, and operation and never regretted our selection.

As you know, the overall project was very challenging and your responsiveness and the personnel that you provided on-site during startup and commissioning were essential to our success.

> General Atomics: ".......commend you and your company for your excellent performance in the design and manufacturing of the Explosive Waste Incinerator........"

William R. Davison
Director
Advanced Process Systems

WRD:ph

United States Senate
Committee on Small Business
Washington, DC

Mr. Ralph W. Hayes
El Dorado Engineering, Inc.
2964 West 4700 South
Suite 109
Salt Lake City, UT 84118

Dear Mr. Hayes:

As the ranking member of the U.S. Senate Committee on Small Business, I want to extend to you my congratulations on El Dorado Engineering, Inc.'s selection as one of the nation's sixty-two 1998 Tibbetts Award winners. This award recognizes that your company is one of the nation's leading participants in the Small Business Innovation Research (SBIR) program.

> United States Senate: "........as the ranking member of the U.S. Senate Committee on Small Business........congratulations on El Dorado Engineering......selection as one of the nation's.....Tibbetts Award winners for Small Business Innovative Research"

nation's other Tibbetts Award Winners.

Sincerely,

John F. Kerry
U.S. Senator

NASA

National Aeronautics and Space Administration
John C. Stennis Space Center
Stennis Space Center, MS

MA00

Mr. Ralph Hayes
El Dorado Engineering
3460 South Redwood Road
Salt Lake City, UT 84119

Dear Mr. Hayes:

I would like to commend you and your company for the excellent engineering and air quality modeling that you have provided NASA on both the Advanced Solid Rocket Motor (ASRM) Program and the Component Test Facility (CTF) at Stennis Space Center for the development of new engine turbo pumps that will use liquid methane and liquid oxygen.

Due to your proven performance on the Pershing II Missile Upper Stage Motor Disposal Project, we initially decided to try the application of your unique modeling capability for the prediction of air quality

> NASA: "Your company has a credible history of timely and professional responses....Your company has pioneered new fields in the use and disposal of explosive materials......."

Your company also assisted us with the difficult task of plume source sampling during the PV-1 firing. The engineering of a competent sampling device directly down stream of a two-minute burn of a million pounds of solid rocket motor propellant was an impressive accomplishment.

Your company has a credible history of timely and professional responses to a variety of engineering and modeling requirements, most of which had to be accomplished within very tight deadlines.

Your company has pioneered new fields in the use and disposal of explosive materials that are essential to furthering the understanding

The National Aeronautics and Space Administration

Awards the

Public Service Group Achievement Award

to

Advanced Solid Rocket Motor

ENVIRONMENTAL IMPACT STATEMENT PREPARATION TEAM

For outstanding teamwork, extraordinary dedication, tireless effort and professionalism in ensuring NASA's compliance with the National Environmental Policy Act and a superb job in putting the Advanced Solid Rocket Motor Project back on schedule.

Ralph Hayes

Signed and sealed at Washington, D.C.
this thirty-first day of March
Nineteen Hundred and Eighty-Nine

Dale D. Myers

ACTING ADMINISTRATOR, NASA

Thermo Scientific Model 51*i*
Total Hydrocarbon Analyzer

Flame ionization for the detection of total hydrocarbon

The Thermo Scientific™ Model 51*i* Total Hydrocarbon (THC) Analyzer combines proven Flame Ionization Detector (FID) technology, easy to use menu-driven firmware, and advanced diagnostics to offer unsurpassed flexibility and reliability. The Model 51*i* analyzer is available in low temperature and high temperature versions.

- Flame Ionization Technology (FID) measures organic gases & vapors
- Adjustable ranges
- Real-time correction of THC readings
- Ethernet port and flash memory offer efficient global access

The Thermo Scientific Model 51*i* Total Hydrocarbon (THC) Analyzer combines proven Flame Ionization Detector (FID) technology, easy to use menu-driven firmware, and advanced diagnostics to offer unsurpassed flexibility and reliability. The Model 51*i* analyzer is available in low temperature and high temperature versions.

The Model 51*i* analyzer uses a Flame Ionization Detector, or FID, to measure organic gases and vapors. FID is a wellknown technology that has been used in laboratories and industry for many years. Flame Ionization Detectors are highly efficient; providing a wide linear range and sensitive detection of organic compounds.

This state-of-the-art gas analyzer also offers features such as an Ethernet port and a flash memory for increased data storage. Ethernet connectivity provides efficient remote access, allowing the user to download measurement information directly from the instrument without having to be on-site.

Easily programmable short-cut keys allow you to jump directly to frequently accessed functions, menus or screens. The larger interface screen can display up to five lines of measurement information while primary screen remains visible.

Thermo SCIENTIFIC

Thermo Scientific Model 51*i* Total Hydrocarbon Analyzer

Preset Ranges	0-1, 10, 100, 1,000, 5000, and 10000 ppmc
Custom Ranges	0-1 to 10000 ppmc
Zero Noise	0.025 ppmc RMS (10 second averaging time)
Minimum Detectable	0.050 ppm (10 second averaging time)
Zero Drift *(24 Hours)*	< 0.50 ppm
Span Drift *(24 Hours)*	< 2% of range or 0.20 ppm (whichever is larger)
Response Time (90%)	15 seconds at 1 second averaging time
Precision	2.0% of reading or 0.1 ppm (whichever is larger)
Linearity	+/-2.0% of span (at concentrations of 10% to 150% of span)
Sample Flow Rate	0.75 to 1.50 lpm nominal
Makeup Air Flow Rate	150 ccm to 300 ccm hydrocarbon free air
Fuel Flow Rate	10 to 35 ccm hydrogen or 50 to 120 ccm H2/He mixture
Operating Temperature	15° to 35°C
Power Requirements	100 VAC, 115 VAC, 220-240 VAC +/-10%, 50/60Hz, 420W
Size and Weight	16.75"(W) x 8.62"(H) x 23"(D), 50 lbs. (22.7 kg)
Outputs	selectable voltage, RS232/RS485, TCP/IP, 10 status relays, and power fail indication 0-20 or 4-20 mA isolated current output (optional)
Inputs	16 digital inputs (standard), 8 0-10 Vdc analog inputs (optional)

Ordering Information

Model 51*i* Total Hydrocarbon Analyzer
Choose from the following configurations/options to customize your own Model 51*i* analyzer

Model 51*i*-HT

1. Voltage options:
A = 120 VAC 50/60 Hz (standard)
B = 220 VAC 50/60 Hz
J = 100 VAC 50/60 Hz

2. Internal zero / span:
M = No Internal Zero / Span, Mixed Fuel
N = No Internal Zero / Span, Hydrogen Fuel
Y = Internal Zero / Span, Mixed Fuel
Z = Internal Zero / Span, Hydrogen Fuel

3. Optional I/O:
A = None (standard)
C = 0-20, 4-20mA current output - 6 channel, 0-10v analog input - 8 channel

4. Mounting Hardware:
A = Bench mounting (standard)
B = Ears & handles, EIA
C = Ears & handles, retrofit

Your Order Code: 51i-HT - _ _ _ _

Model 51*i*-LT

1. Voltage options:
A = 120 VAC 50/60 Hz (standard)
B = 220 VAC 50/60 Hz
J = 100 VAC 50/60 Hz

2. Internal zero / span:
N = No Internal Zero / Span, Hydrogen Fuel
Z = Internal Zero / Span, Hydrogen Fuel

3. Optional I/O:
A = None (standard)
C = 0-20, 4-20mA current output - 6 channel, 0-10v analog input - 8 channel

4. Mounting Hardware:
A = Bench mounting (standard)
B = Ears & handles, EIA
C = Ears & handles, retrofit

Your Order Code: 51i-LT - _ _ _ _

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. We offer comprehensive, flexible support solutions for all phases of the product life cycle. Through predictable, fixed-cost pricing, our services help protect the return on investment and total cost of ownership of your Thermo Scientific products.

For more information, visit our website at thermoscientific.com/air

This product is manufactured in a plant whose quality management system is ISO 9001 certified.

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info aq breda@thermofisher.com

Thermo SCIENTIFIC
Part of Thermo Fisher Scientific

Thermo Scientific Model 48*i*
Carbon Monoxide Analyzer

Gas filter correlation analyzer

The Thermo Scientific™ Model 48*i* Carbon Monoxide (CO) Analyzer utilizes gas filter correlation technology to measures the amount of carbon monoxide in the air.

- Approved to meet the following standards: U.S. EPA , UK Environmental Agency and the European Union
- Ethernet connectivity for efficient remote access
- Enhanced user interface with one button programming and large display screen
- Flash memory for increased data storage and user downloadable software

The Model 48*i* analyzer is based on the principle that carbon monoxide (CO) absorbs infrared radiation at a wavelength of 4.6 microns. Because infrared absorption is a nonlinear measurement technique, it is necessary for the instrument electronics to transform the basic analyzer signal into a linear output.

The Model 48*i* analyzer uses an exact calibration curve to accurately linearize the instrument output over any range up to a concentration of 10,000ppm.

This state-of-the-art gas analyzer offers features such as an Ethernet port as well as flash memory for increased data storage.

Ethernet connectivity provides efficient remote access, allowing the user to download measurement information directly from the instrument without having to be on-site.

Easily programmable short cut keys allow you to jump directly to frequently accessed functions, menus or screens. The larger interface screen can display up to five lines of measurement information while primary screen remains visible.

Thermo
SCIENTIFIC

Thermo Scientific Model 48*i* Carbon Monoxide Analyzer

Preset Ranges	0-1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000 and 10000 ppm 0-1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000 and 10000 mg/m^3
Custom Ranges	0-1 to 10000 ppm 0-1 to 10000 mg/m^3
Zero Noise	0.02 ppm RMS (60 second averaging time)
Lower Detectable Limit	0.04 ppm
Zero Drift *(24 hour)*	< 0.1 ppm
Span Drift *(24 hour)*	+/-1% full scale
Response Time	60 seconds (30 second average time)
Precision	+/-0.1 ppm
Linearity	+/-1% full scale < 1000 ppm +/-2.5% full scale > 1000 ppm
Sample Flow Rate	0.5-2 liters/min.
Operating Temperature	Performance specifications based on operation within 20°-30° C range (per U.S. EPA Guidelines). Instrument may be safely operated over the range of 0°-45° C.
Power Requirements	100 VAC, 115 VAC, 220-240 VAC +/-10% @ 275W
Size and Weight	16.75"(W) x 8.62"(H) x 23"(D), 49 lbs. (22.2 kg)
Outputs	Selectable voltage, RS232/RS485, TCP/IP, 10 status relays and power fail indication (standard) 0-20 or 4-20 mA isolated current output (optional)
Inputs	16 digital inputs (standard), 8 0-10 Vdc analog inputs (optional)
Approvals and Certifications	U.S. EPA Reference Method: RFCA-0981-054 MCERTS Certified: Sira MC070095/00 EN14626: TÜV 936/21203248/A Report

Ordering Information

Model 48*i* Carbon Monoxide Analyzer
Choose from the following configurations/options to customize your own Model 48*i* analyzer

1. Voltage options:
A = 120 VAC 50/60 Hz (standard)
B = 220 VAC 50/60 Hz
J = 100 VAC 50/60 Hz

2. Internal zero / span and/or Oxygen Sensor:
N = No zero / span valve assembly (standard)
A = No zero/ span valve w/ Zero Air Scrubber
Z = Internal zero / span valve assembly
C = Internal zero / span valve w/ Zero Air Scrubber
G = Oxygen Sensor with NO Zero/Span
R = Oxygen Sensor with Zero/Span

3. Filter wheel purge:
S = Standard plumbing (standard)
P = Filter wheel purge setup

4. Optional I/O:
A = No optional I/O (standard)
C = 4-20mA current output - 6 channels, 0-10v analog input - 8 channel

5. Mounting hardware:
A = Bench mounting (standard)
B = Ears & handles, EIA
C = Ears & handles, retrofit

Your Order Code:
Model 48i - _ _ _ _ _

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. We offer comprehensive, flexible support solutions for all phases of the product life cycle. Through predictable, fixed-cost pricing, our services help protect the return on investment and total cost of ownership of your Thermo Scientific products.

For more information, visit our website at thermoscientific.com/ambient

This product is manufactured in a plant whose quality management system is ISO 9001 certified.

USA
27 Forge Parkway
Franklin, MA 02038
Ph: (866) 282-0430
Fax: (508) 520-1460
customerservice.aqi@thermofisher.com

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C/327, TTC Industrial Area
MIDC Pawane
New Mumbai 400 705, India
Ph: +91 22 4157 8800
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Thermo SCIENTIFIC
Part of Thermo Fisher Scientific

Thermo Scientific Model 42*i*-LS
Low Source NO-NO_2-NO_x Analyzer

Chemiluminsescent gas analyzer

The Thermo Scientific™ Model 42i-LS Low Source Analyzer utilizes chemiluminescent technology to measure the amount of nitrogen oxides in the air from sub-ppm levels up to 100ppm.

- Ethernet connectivity for efficient remote access
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- Enhanced user interface with one button programming and large display screen
- Flash memory for increased data storage and user downloadable software
- Enhanced electronics design optimizes product commonality
- Improved layout for easier accessibility to components

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The Model 42*i*-LS analyzer is a single chamber, single photomultiplier tube design that cycles between the NO and NO_x modes.

The 42*i*-LS analyzer has independent outputs for NO, NO_2, and NO_x and each can be calibrated separately. Dual range and Auto range are standard features as well. If required, the instrument can operate continuously in either the NO or NO_x modes allowing for response times of less than 5 seconds.

Temperature and pressure correction are standard features. User settable alarm levels for internal diagnostics are available from an easy to follow menu structure.

This state-of-the-art gas analyzer offers features such as an Ethernet port as well as flash memory for increased data storage. The Ethernet connectivity provides efficient remote access, allowing the user to download measurement information directly from the instrument without having to be on-site.

Easily programmable short-cut keys allow you to jump directly to frequently accessed functions, menus or screens. The larger interface screen can display up to five lines of measurement information.

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Thermo Scientific Model 42*i*-LS Low Source NO-NO_2-NO_x Analyzer

Measurement Ranges	0-0.5ppm to 0-500ppm or 0-2mg/m3 to 0-750 mg/m3
Zero Noise	Better than 0.005 ppm RMS (1 minute average time)
Lower Detectable Limit	0.01 ppm (1 minute average time)
Zero Drift (24 hour)	0.005 ppm
Span Drift (24 hour)	+/-1% full scale
Linearity	+/-1% full scale
Sample Flow Rate	~110 cc/min
Temperature	Range Performance specifications based on operation within 15°- 35° C range. Instrument may be safely operated over the range of 0°- 45° C
Power Requirements	100 VAC, 115 VAC, 220-240 VAC +/-10% @ 300W
Size and Weight	16.75"(W) x 8.62"(H) x 23"(D), 55 lbs. (25 kg)
Outputs	Selectable Voltage, RS232/RS485, TCP/IP, 10 Status Relays, and Power Fail Indication (standard). 0-20 or 4-20 mA Isolated Current Output (optional)
Inputs	16 Digital Inputs (standard), 8 0-10 Vdc Analog Inputs (optional)

Ordering Information

Model 42*i*-LS Low Source Analyzer
Choose from the following configurations/options to customize your own Model 42*i* LS analyzer

1. Voltage options:
A = 120 VAC 50/60 Hz (standard)
B = 220 VAC 50/60 Hz
J = 100 VAC 50/60 Hz

2. Internal zero / span:
N = No zero / span assembly (standard)
Z = Internal zero span assembly

3. Converter options:
M = Molybdenum
S = Stainless steel (standard)

4. Sample handling:
S = Standard plumbing (standard)

5. Ozone handling:
D = Drierite scrubber (standard)
P = Permeation dryer

6. Optional I/O:
A = None (standard)
C = 0-20, 4-20mA current output - 6 channel, 0-10v analog input - 8 channel

7. Mounting Hardware:
A = Bench mounting (standard)
B = Ears & handles, EIA
C = Ears & handles, retrofit

Other options:
- Teflon particulate filter
- Ozone particulate filer
- Rack mounts
- Rear extender

Your Order Code: 42*i*-LS - _ _ _ _ _ _ _

To maintain optimal product performance, you need immediate access to experts worldwide, as well as priority status when your air quality equipment needs repair or replacement. We offer comprehensive, flexible support solutions for all phases of the product life cycle. Through predictable, fixed-cost pricing, our services help protect the return on investment and total cost of ownership of your Thermo Scientific products.

For more information, visit our website at thermoscientific.com/air

This product is manufactured in a plant whose quality management system is ISO 9001 certified.

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