Thermo Scientific FLASH 2000 Series Organic Elemental Analyzers

Carbon, Hydrogen, Nitrogen, Sulfur and Oxygen analyzers


Organic Chemistry & Pharmaceuticals


Petrochemistry & Energy


Environmental Analysis

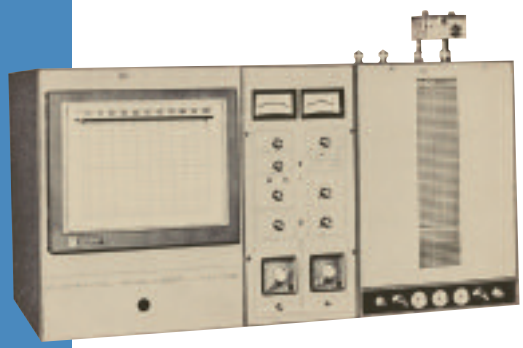

Material Characterization


Agronomy & Marine Science

Thermo SCIENTIFIC

Tradition and Innovation

The Thermo Scientific FLASH 2000 Series makes Organic Elemental Analysis (OEA) a simple, precise and cost-effective tool for any laboratory. With a long and successful history in OEA starting back in 1968 with the first automated analyzer (trading as Carlo Erba), you can be confident that your Thermo Scientific OEA is from a knowledgeable and dedicated team.



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Utilizing our experience in OEA, Thermo Fisher Scientific offers a sophisticated package of benefits with the FLASH 2000 Series including:

- **Wide analytical range, allowing extensive applications**
  – *The FLASH 2000 Series is now a standard in Elemental Analysis in terms of accuracy, precision and versatility; as confirmed by the over 1,000 installations worldwide.*
- **Versatility and Modularity**
  – *Versatility and modularity are key design aspects of the FLASH 2000 Series, ensuring performance that meets your requirements, no matter how often those requirements change.*
- **Accuracy and Precision**
  – *A high precision integrated electronic mass flow controller achieves extensive stability in flow and temperature parameters thus ensuring the highest levels of precision and accuracy of results for both homogeneous and non-homogeneous samples from trace to high amounts.*
- **Ease of use**
  – *The FLASH 2000 Series makes OEA one of the simplest methods of analysis. With unique functions such as Auto-Start, Auto-Standby, Auto-Ready and Automatic Leak Test, the demands on operators are significantly reduced. The Eager Xperience software also simplifies operation by minimizing user involvement in setting up the analyzer.*
- **Comprehensive and user-friendly software**
  – *A useful and powerful tool tailored for every lab requirement.*

All these benefits lead to cost effective analysis

Wide range of applications

The FLASH 2000 Series allows a variety of configurations tailored to the application they serve:

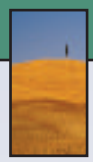
Organic/Inorganic Chemistry & Pharmaceuticals

- Fine Chemicals
- Pharmaceuticals Products
- Organo-metallic compounds
- Polymers
- Plastic
- Synthetic rubbers
- Fibers
- Explosives
- Catalysts
- Textiles
- Pesticides
- Detergents
- Fluorine-compounds

Material Characterization

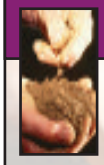
- Glue/Resins
- Papers
- Rubbers
- Cement
- Ceramics
- Carbon/Glass Fibers
- Tires
- Pigments & Dyes
- Refractory materials
- Building materials
- Inorganic materials
- Metals
- Textile fibers
- Wood powders

Environmental Analysis



- Soils, sediments, and rocks
- Composts
- Wastes
- Sewage/sludge
- Pesticides
- Water solution
- Waste Water
- Particulates in Air by Filters
- Particulates in Water by Filters
- Woods

Agronomy & Marine Science



- Soil
- Plants (leaves, roots, fruit)
- Sediments
- Humus
- Algae
- Plankton
- Particulate matter in water by filters
- Water
- Fertilizer

Petrochemistry & Energy

- Coals
- Cokes
- Crude oils
- Gasoline/Diesel
- Alternative fuels
- Petroleum derivates
- Lubricants
- Oil additives
- Graphite

Human & Animal Samples

- Blood
- Hairs
- Nails
- Serum
- Urine
- Faeces

Isotope Analysis

- Soil and plant research
- Forensic
- Bio Oceanography
- Food and goods control

FLASH 2000 configurations:

- FLASH 2000 CHN
- FLASH 2000 CHN/O
- FLASH 2000 CHNS
- FLASH 2000 CHNS/O
- FLASH 2000 N org
- FLASH 2000 N Lubricants
- FLASH 2000 NC org
- FLASH 2000 NCS
- FLASH 2000 NC Soils/Sediments/Filters
- FLASH 2000 IRMS & HT

High flexibility to meet any requirement

Flash Combustion

The FLASH 2000 Series Analyzer operates according to the dynamic flash combustion (modified Dumas method) of the sample for the determination of Carbon, Hydrogen, Nitrogen and Sulfur. Samples - organic or inorganic, solid or liquid – are weighed in a tin capsule and introduced into the combustion reactor by an autosampler. When the sample enters the reactor, inserted in the special furnace heated at 900 – 1000°C, a small volume of pure Oxygen is added to the system and helps to burn the organic or inorganic material, converting the sample into elemental (simple) gases. A separation column and TCD detector allows the user to determine element concentrations without using a complex splitting system, aliquote dosing device or purge & trap adsorbers. On the same instrument, but working in a different analytical condition, the Oxygen determination can be obtained when operating in pyrolysis mode. Utilizing the Flash Dynamic Combustion method, the FLASH 2000 Series achieves accurate and precise sample characterization within a few minutes.

Sample Introduction, tailored to your needs

Whether you require high throughput or a cost-effective solution, the FLASH 2000 Series is available with a choice of autosamplers, to ensure that your analysis starts efficiently

- Thermo Scientific MAS 200R universal autosampler
  – *The MAS 200R is a mechanically driven, reliable workhorse suitable for both liquid and solid samples. The samples loaded in tin capsules are automatically dropped into the combustion reactor sequentially by electronically controlled movements. As standard, the MAS 200R includes a 31-position sample carousel, but up to three more carousels can be added during the analytical process for an uninterrupted analysis of up to 124 samples.*

FLASH 2000 CHNS/O Analyzer with MAS 200R 4 drums

MAS 200R and AS3000 Autosamplers

- Thermo Scientific AI/AS 3000 autosamplers
  – *The AI and AS 3000 autosamplers mount effortlessly to the top of the FLASH 2000 Series. The AI autosampler is ideal for those analyzing lower sample numbers with an 8 position tray. The AS 3000, with a 105 sample capacity is more suited for high throughput laboratories. Both are easy to mount and feature an automatic alignment system with optical sensors to ensure safe and reproducible syringe positions, which ultimately result in more accurate and reproducible data. Furthermore, the autosamplers are controlled by the Eager Xperience software which provides users with a Help routine.*

New Horizons for OEA – The FPD Option for Sulfur trace analysis

Determination of Sulfur content in trace analysis is becoming more and more important due to the wide presence of this element in numerous organic and inorganic compounds.

By coupling the FLASH 2000 Series to an OEA / FPD (Flame Photometric Detector) system, it is possible to reach as low as 5-10 ppm of Sulfur, which opens a new horizon for OEA applications.

Approved by official organizations

The Dynamic Flash Combustion technique is endorsed by a large array of renowned international official organizations including AOAC (Association of Official Analytical Chemists), AOCS (American Oil Chemists Society), AACC (American Association of Cereal Chemists), ASTM (American Society for Testing and Materials) and ASBC (American Society of Brewing Chemists). The simplicity of the method, unparalleled data reproducibility and truly quantitative results are the essence of this wide acceptance.

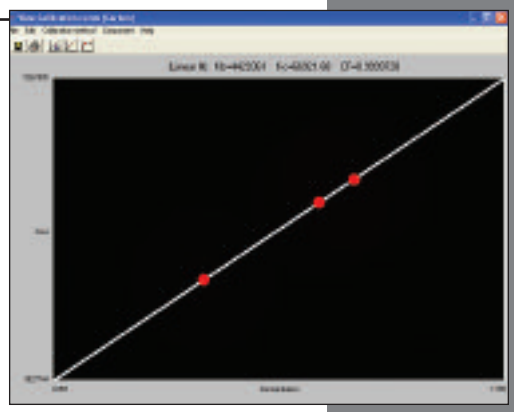
Eager Xperience software:

The most comprehensive software dedicated to OEA

The dedicated software controls the operation, data acquisition and data evaluation capabilities of the FLASH 2000 Series enabling quick reference to method parameters and instrument status readout. Users can configure this flexible platform to gain access to either all available features or alternatively to a customized and simplified user interface incorporating pre-set methods. Eager Xperience is the most advanced, complete and flexible dedicated software for OEA applications.

Calibration

For easy instrument calibration either K factor, linear regression or quadratic fit response can be selected, according to the type of analysis requested or to the detection range evaluated.

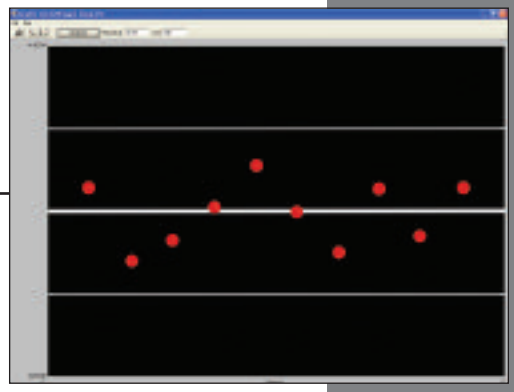


Average Visualization

Users often prefer visual aids when performing a Quality Control of the results: Average Visualization allows users to control the data variation and the precision and accuracy of the results at-a-glance. This is useful for preparing a complete and personalized analytical report.

Green / Red light indicators

This simple yet ingenious function enables users to evaluate at-a-glance whether the Nitrogen, Carbon, Hydrogen and Sulfur percentage value is within the expected acceptable range or control limits. The acceptable range can be a default value or user defined according to the characteristics of the compound, the sample nature and the precision required.

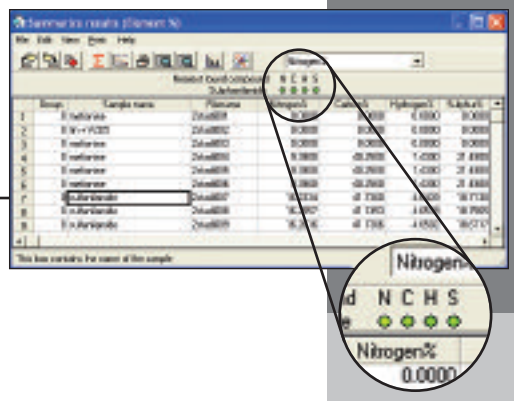


Maintenance

Eager Xperience allows users to pre-program the maintenance of the instrument and monitor the status of catalysts, filters and adsorbers in real time. A color change from green to yellow indicates the catalysts usage while red indicates that maintenance needs to be performed.

Consumables Catalog

An electronic Consumables Catalog with information on chemicals, spare parts and accessories is available within Eager Xperience. User-friendly pathways guide users through the catalog offering an easy access to the various sections and providing the required information in a straightforward, quick and simple way.

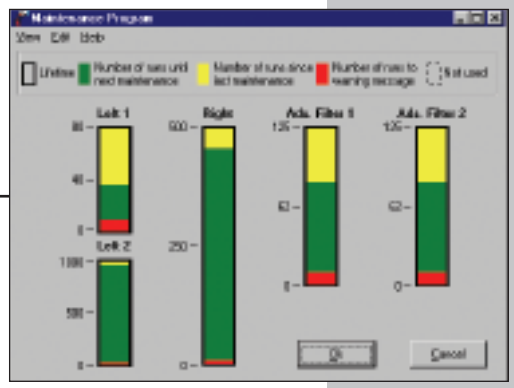


Powerful Report Publisher

Users can customize an analytical report format to contain information such as chromatograms, analytical conditions, statistical evaluation of results and relative graphics, operator nominative and company logos.

Interfacing Analytical Balance

Eager Xperience provides a direct interface to the most common analytical balances. The direct connection allows users to transfer sample weights to the software eliminating the transcription errors.



21 CFR part 11 Compliance

Eager Xperience software supports compliance to strict FDA regulations (21 CFR part 11) for a closed analytical system included data security, method authorization, electronic signature etc.

Optimized operation for lower cost

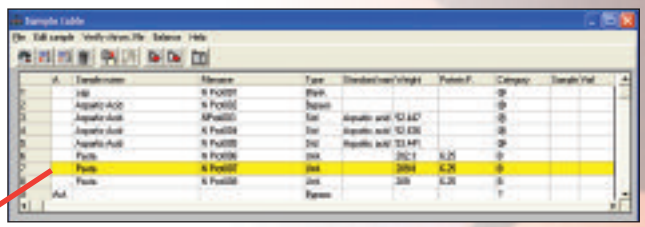
Thermo Scientific OxyTune™ – Automatic Oxygen Dosing System

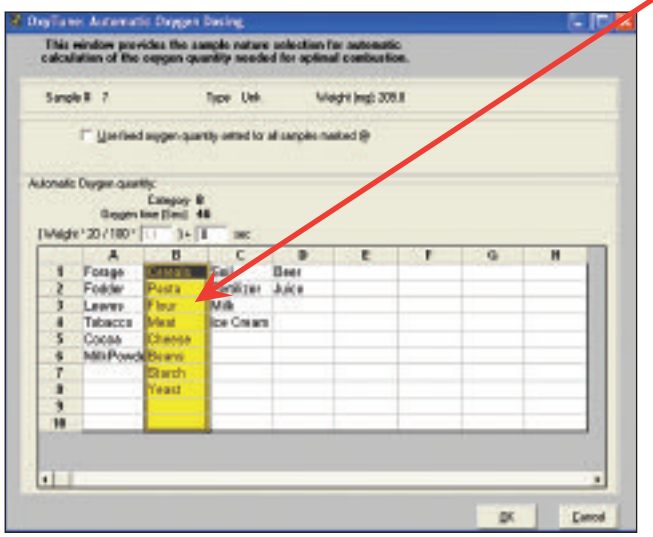
This capability enables the FLASH 2000 Series to supply the precise volume of Oxygen needed for the optimized combustion of each sample in an easy and simple way. This process significantly reduces the quantity of Oxygen needed, dramatically extends the lifetime of the catalyst and minimizes user involvement in setting-up the analyzer.

Additionally, organic and inorganic matter is completely combusted, providing quantitative results over a wide analytical range. In case the sample does not appear within the family of compounds preloaded, it is possible for the user to edit the list by adding their own family. This provides a simple solution to reduce costs per analysis, whatever the sample.

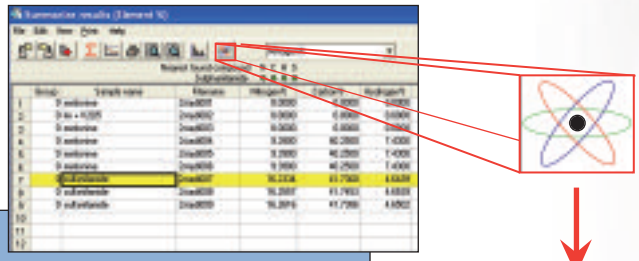
Minimized maintenance downtime

The simple analytical layout of FLASH 2000 Series ensures fast and easy maintenance. The combustion and reduction reactors are plumbed through 'Fast Connectors' making them easily accessible from the front of the instrument and simplifying their replacement. The fast heating capability of the reactors reduce unnecessary waiting time hence maximizing sample throughput. Leak check of the analytical gas flow path after each maintenance procedure is automatically performed under the control of the Eager Xperience software without the need for laborious user intervention. Furthermore, Auto-Start, Auto-Standby and Auto-Off functions of the Eager Xperience software drastically decrease the need of instrument downtime for maintenance. The end result is substantial operating and analytical cost savings.





Automatic Oxygen Dosing System



Empirical Formula

Eager Xperience is able to automatically calculate the Empirical Formula and the relative Molecular Weight in within only a few seconds, without the need to transfer results into any external software. Molecules with even up to 7 unknown elements and up to 2000 amu can be calculated. For humid compounds and if the percentage of water is known, the suitable correction can be easily inserted in the calculation system.

Unique capabilities

FLASH 2000 & Isotope Ratio Mass Spectrometry (IRMS) – a powerful combination

The accurate determination of Nitrogen, Carbon, Sulfur, Oxygen and Hydrogen Isotope ratio offers a powerful tool in many research areas from environmental and agronomy to nutritional and marine biology. Connection between the FLASH 2000 Series and IRMS takes advantage of the extremely simple FLASH 2000 analytical layout, whereby gas splitting is not required and therefore highly quantitative results are easily obtained regardless of the complexity of the determination.

There are two dedicated models of the FLASH 2000 for use with IRMS.

- FLASH 2000 IRMS – to determine the isotope analysis of N and C by combustion
- FLASH 2000 HT (High Temperature) – In addition to NC (or Sulfur) analysis it is possible to evaluate H and O using a HT furnace (1450 °C).

FLASH 2000 / Delta IRMS

FLASH 2000 Validation

A comprehensive Validation Kit ensures quick and efficient validation to meet the stringent prerequisites required for the different analytical industrial areas. The Kit consists of a Validation Folder that collates the IQ (Installation Qualification), OQ (Operational Qualification) and PQ (Performance Qualification) procedures and a dedicated Configuration Pack, which includes all the items needed for validating the instrument. A certified Thermo Scientific engineer performs the validation.

Thermo Scientific
FLASH 4000 N/Protein analyzer

For dedicated N/Protein analysis, the FLASH 4000 completes the Thermo Scientific range of organic elemental analyzers. Visit www.thermo.com/flash4000 for information.

Laboratory Solutions Backed by Worldwide Service and Support

Tap our expertise throughout the life of your instrument. Thermo Scientific Services extends its support throughout our worldwide network of highly trained and certified engineers who are experts in laboratory technologies and applications. Put our team of experts to work for you in a range of disciplines – from system installation, training and technical support, to complete asset management and regulatory compliance consulting. Improve your productivity and lower the cost of instrument ownership through our product support services. Maximize uptime while eliminating the uncontrollable cost of unplanned maintenance and repairs. When it's time to enhance your system, we also offer certified parts and a range of accessories and consumables suited to your application.

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In addition to these offices, Thermo Fisher Scientific maintains a network of representative organizations throughout the world.

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