

**Thermo Scientific FLASH 4000
N / Protein analysis
Bursting with productivity**



Beyond the Kjeldahl Method



Food



Beverages



Animal Feed

FLASH 4000

N/Protein Analyzer

Expand your laboratory's capabilities with an automated, accurate and reliable method to determine Nitrogen/Protein in any type of food and beverages using large sample amounts - up to 2g!

The Thermo Scientific FLASH 4000 is a step forward for determination of N/Protein concentration in any food matrix.

Based on the Dynamic FLASH Combustion technique – well known as a modified Dumas method – the FLASH 4000 is the optimum choice for Quality Control and R&D environments in the food industry.

With proven accuracy and unbeatable cost-per-analysis, the FLASH 4000 gives lab managers an automated 24/7 solution for solid and liquid samples that they can be confident in.



Based on more than 40 years experience in the OEA field, incorporating the Carlo Erba and Fisons Instruments, the FLASH 4000 model is the new generation of high quality and productive Thermo Scientific Organic Elemental Analyzers.



Bursting with Productivity

now with a large sample volume capacity

Beyond Kjeldahl

The classical Kjeldahl Nitrogen method (involving sample oxidation by digestion in sulphuric acid followed by distillation and off-line titration measurements), is extremely time-consuming, expensive, and requires laboratory safety measures.

As Kjeldahl becomes inadequate in meeting international safety rules, many official methods (e.g. AOAC, AOCS, AACC), support the Dynamic Flash Combustion/ modified Dumas method as an alternative to the well known Kjeldahl method. Furthermore, the Kjeldahl method suffers from high waste cost, the inability to operate continuously, and is dependent on the user's experience and capabilities.

The FLASH 4000 N/Protein analyzer overcomes all concerns of the Kjeldahl method, by reducing sample preparation. This in turn eliminates safety concerns, operator experience requirements, costs of preparation materials and most significantly, the time involved.



**Reduces Kjeldahl
analysis time from
*hours to minutes!***

Automation

for today's busy laboratories

Simplicity in design ensures accurate results for any material requiring Nitrogen / Protein determination. The simple configuration of the FLASH 4000 includes a sample loader, oxidation and reduction furnace, a Peltier system for water elimination, a regenerative CO₂ trap (patent pending) for eliminating the CO₂ produced during the combustion, a GC separation column and a thermal conductivity detector.

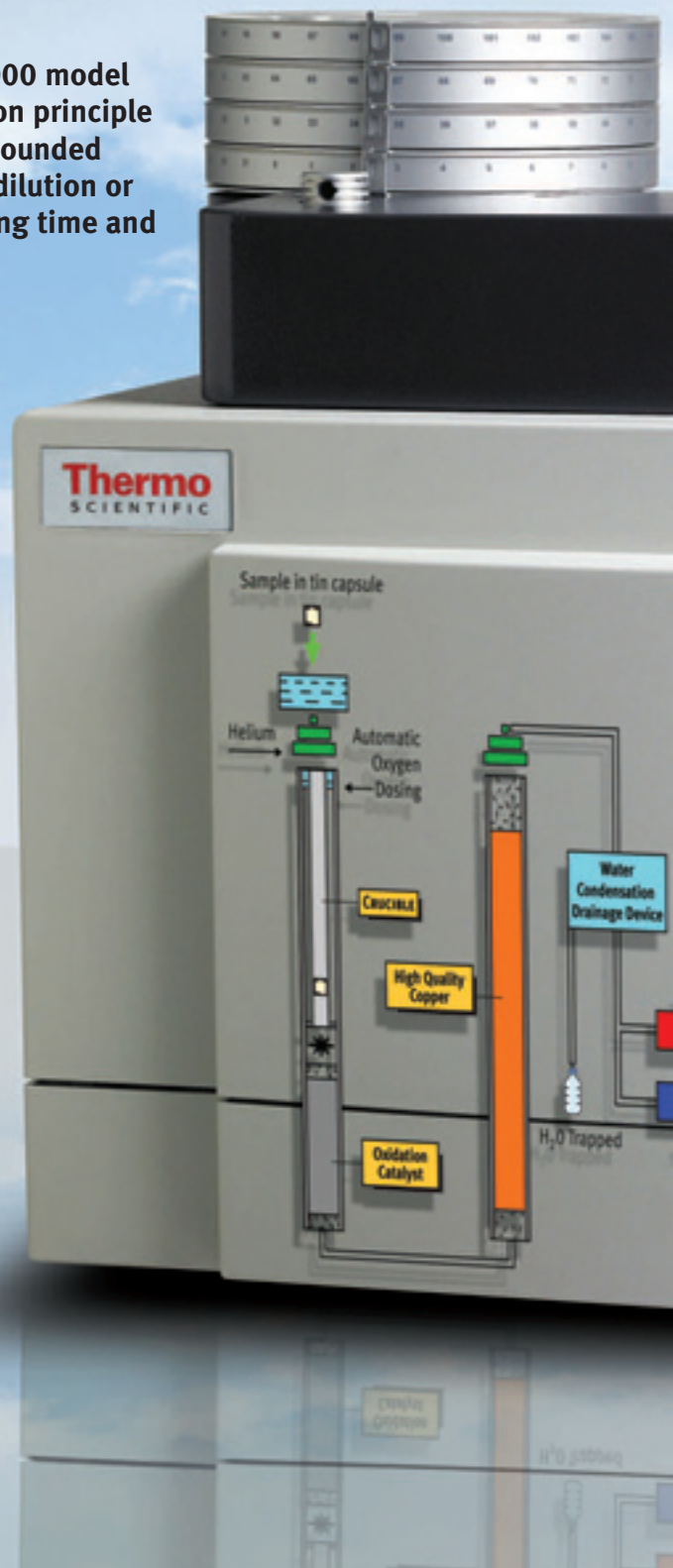
The large sample capacity of the FLASH 4000 model combined with the unique Flash combustion principle ensures optimum conversion of Nitrogen bounded compounds into elemental gases without dilution or splitting of the gases. This reduces handling time and increases accuracy.

Automated running

The **Thermo Scientific MAS 4000 Autosampler** provides fully automatic running of 31 solids samples (loaded in Tin capsules to eliminate contamination). The multiple tray concept of the MAS 4000 sampler can enhance productivity to a capacity of 124 sample positions.

Automated maintenance

Patent pending **Regenerative CO₂ Traps** improve the autonomy of the FLASH 4000. Consisting of two CO₂ traps which are automatically activated, the traps are always ready to adsorb any CO₂ generated during the flash combustion and so increase the up-time of the analyzer.



Cost savings

for the conscientious lab manager

Water condensation drainage device

To remove water out of the combustion gases, the FLASH 4000 is fitted with a Peltier device. As this eliminates the need to use and purchase solid adsorbers, operating costs are reduced.

Electronic Flow Controller

Reproducibility, performance and accuracy are increased with the FLASH 4000 by the presence of an **Electronic Flow Controller (EFC)** which regulates gas flow. The EFC system is also connected to the dedicated Eager Xperience software, allowing users to perform an Automatic Leak Check Test.



Xperience simplicity

Thermo Scientific Eager Xperience Software

Straightforward Operation

Simply place the sample container in the MAS4000 autosampler and press the start key. The analytical conditions (Flows, Temperature, Timing, Oxygen injection etc.) are controlled and evaluated by the Eager Xperience according to the sample nature and the sample weight.

New Levels of Automation – and Cost Savings!

According to the sample nature and sample weight, the **Thermo Scientific OxyTune®** function automatically computes the quantity of Oxygen required to achieve complete combustion of the material without any user input. This drastically increases the catalyst lifetime: reducing the instrument downtime for maintenance and saving significant costs per analysis.

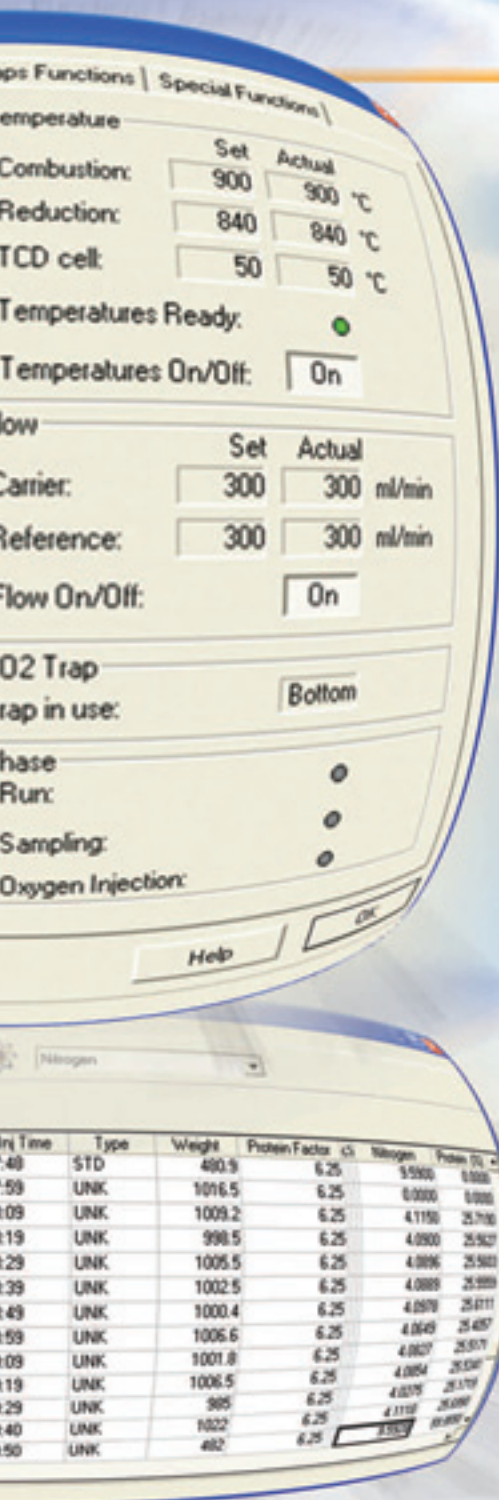
Other cost saving functions are **Auto-Ready, Auto-Off, Auto-Start and Auto-Standby**, which allow un-attended

24/7 operation.

Simple and Precise Results

At the end of the analytical cycle, the dedicated Eager Xperience software reports the results as **Nitrogen percent and/or Protein percent** using an operator selected protein conversion factor. Protein conversion factors can be changed according to different types of food applications.





Calibration Flexibility

Results can be evaluated using a standard calibration system, as prescribed in official methods (such as AOAC, AOCS, ASBC, AACC*) or a multiple standard linear regression calibration.

Easy to Control

Users often prefer visual aids when performing Quality Control of the results.

Average data visualization provides control and variation analysis at-a-glance. This visual graphic can be used for preparing a complete bespoke analytical report.

QC Functionality

Evaluating if the measured Nitrogen concentration is within the acceptable control limit range could not be easier with our **Red/Green Light Indicators**. The red/green light function provides an on-sight YES/NO result, which is ideal for QC analysts who need answers fast. The Control Limits can be pre-set by the user according to the characteristic of the compound, the sample nature and the lab precision required.

Maintaining Productivity

Pre-program the maintenance of the instrument and monitor the status of the crucible, oxidation and reduction catalysts at any time. A colour change from green to yellow indicates the catalyst usage, while the red suggests to the user that the maintenance needs to be performed.



Typical results

FLASH 4000 N / Protein determination - Applications

SAMPLE	RANGE WEIGHT (MG)	N %	PROTEIN %	RSD %
Pasta	500 - 1800	1.9330	12.0812	0.1551
Starch	800 - 2000	0.2527	1.5794	1.0520
Cocoa	300 - 1200	3.7662	23.5387	0.1883
Wheat flour	500 - 1800	1.8165	11.3529	0.5967
Corn flour	500 - 1800	1.2630	7.8936	0.6431
Rice flour	500 - 1800	1.5408	9.6301	0.4682
Soy flour	500 - 1800	5.4548	34.0925	0.4039
Rice	600 - 1600	1.2017	6.8500	0.5362
Barley	600 - 1600	1.9467	12.1669	0.8790
Red beans	600 - 1600	4.0262	25.1641	0.4432
Green Peas	600 - 1600	4.0241	25.1507	0.4060
Chickpeas	600 - 1600	3.5462	22.1637	0.5213
Lentils	600 - 1600	4.0196	25.1227	0.6970
Sunflower	500 - 1200	3.0640	19.1500	0.6546
Ham	400 - 2500	2.8204	17.6278	1.0746
Salame	500 - 1800	4.4888	28.0552	1.3629

Other market applications which are covered by the FLASH 4000 are:

- Baby and Diet Food applications
- Breweries and Beverages
- Agronomy
- Material Characterization

FLASH 4000 Validation

A comprehensive FLASH Validation kit ensures quick and efficient validation to meet stringent prerequisites required for the different Food Industry areas.

* : AOAC (Association of Official Analytical Chemists)

AOCS (American Oil Chemists Society)

ASBC (American Society of Brewing Chemists)

AACC (American Association of Cereal Chemists)

Part of a comprehensive range
of FLASH CHNS/O analyzers

Visit www.thermo.com/oedealers
to find your local dealer

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

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BR42119_E 05/08C

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