Figure 1. Thermo Scientific Flash*Smart* Elemental Analyzer.

Thermo Scientific Flash*Smart* Elemental Analyzer: Official Methods

The all-in-one Thermo Scientific™ Flash*Smart*™ Elemental Analyzer (Figure 1) permits the quantitative determination of carbon, nitrogen, hydrogen and sulfur by combustion, and the quantitative oxygen determination by pyrolysis in all application fields. The system copes with all requirements of modern laboratories such as accuracy, reproducibility and low cost per analysis.

The extensive modularity of the Flash*Smart* EA provides over 20 configurations in one Analyzer and allows you to determine from 1 to 5 elements, in a wide range of concentrations in all type of matrix (solid, viscous, liquid, volatile, gas, organic and inorganic) under the full control of the Thermo Scientific™ Eager*Smart*™ Data Handling Software.

The Analyzer can be used for the differentiation between the Total Carbon and Total Organic Carbon determination after an acid pre-treatment of the sample.

The flexibility of the Flash*Smart* allows you to analyze trace sulfur concentrations when it is coupled with the flame photometric detector (FPD). This method combines the advantages of the elemental analyzer with the sensitivity, selectivity and robustness of the FPD.

The Flash*Smart* Analyzer fulfills the requirements of several Official Methods, illustrating the performance and versatility of the instrument. The following tables show the most requested Official Methods in the following application fields:

- Petrochemistry
- Environment
- Food, Animal Feed and Beverages
- Agronomy and Marine Science

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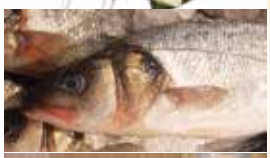
Petrochemistry

Application	Official Association	Official Method
	**ASTM (American Society for Testing Materials)**	Method D 5291 – 09 Standard Test Methods for Instrumental Determination of Carbon, Hydrogen and Nitrogen in Petroleum Products and Lubricant
	**ASTM (American Society for Testing Materials)**	Method D 5373 – 02 Standard Test Methods for Instrumental Determination of Carbon, Hydrogen and Nitrogen in Laboratory Samples of Coal and Coke
	**ASTM (American Society for Testing Materials)**	Method D 5622 Standard Test Methods for the Determination of Total Oxygen in Gasoline and Methanol Fuels by Reductive Pyrolisis
	**ASTM (American Society for Testing Materials)**	Method D 7633 – 13 Standard Test Method for Carbon Black – Carbon Content
	**ASTM (American Society for Testing Materials)**	Method D 4239 - 02 Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke using High-Temperature Tube Furnace Combustion Methods
	**ISO/TS 12902, 2001**	Solid Mineral Fuels – Determination of Total Carbon, Hydrogen and Nitrogen – Instrumental Methods
	**EN 15104, 2011**	Solid Biofuels – Determination of Total Content of Carbon, Hydrogen and Nitrogen – Instrumental Methods
	**CEN / TC 343**	Solid Recovered Fuels – Methods for the Determination of Carbon, Hydrogen and Nitrogen Content
	**MSZ (Hungarian Standards Institution)**	Method 24050 Solid Mineral Fuels. Instrumental Analytical Determination of Carbon, Hydrogen and Nitrogen Content for Coal, Coke, Petroleum Coke

Environment

Application	Official Association	Official Method
	**EN 13137, 2001**	Characterization of Waste – Determination of Total Organic Carbon (TOC) in Waste, Sludges and Sediments

Food, Animal Feed and Beverages

Application	Official Association	Official Method
	**AACC (American Association of Cereal Chemists)**	Crude Protein in Cereal, 46-30, 1999
	**AOAC (Association of Official Analytical Chemists)**	Official Method 990.03. Protein (crude) in Animal Feed 4.2.08
	**AOAC (Association of Official Analytical Chemists)**	Official Method 992.15. Crude Protein in Meat and Meat Products including Pet Foods 39.1.16
	**AOAC (Association of Official Analytical Chemists)**	Official Method 992.23. Crude Protein in Cereals, Grain and Oilseeds 32.2.02
	**AOCS (American Oil Chemists Society)**	Official Method Ba 4e-93 (revised 1995). Combustion Method for Determination of Crude Protein
	**ASBC (American Society of Brewing Chemists)**	Official Method 1996. Nitrogen Determination in Barley
	**ASBC (American Society of Brewing Chemists)**	Total Nitrogen in Wort and Beer by Combustion Method. Report of Subcommittee, 1994
	**Office International de la Vigne et du Vin**	Resolution OENO 13/2002 Quantification of Total Nitrogen by Dumas Method (Must and Wines) Quantification de l'Azote Total Selon la Methode de Dumas (Mouts et Vins)
	**IFFO (International Fishmeal and Fish Oil Organization Ltd.)**	Nitrogen Determination in Fish Meal by Combustion Method
	**ISO 14891 (International Organization for Standardization)** **FIL 185 (International Dairy Federation)**	Nitrogen Determination in Dairy Products by Combustion Method
	**DIN, EN, ISO 16634-1, 2008 (International Organization for Standardization)**	Food Products – Determination of the Total Nitrogen Content by Combustion According to the Dumas Principle and Calculation of the Crude Protein Content. Part 1: Oil Seeds and Animal Feeding Stuffs
	**DIN, EN, ISO 16634 – 2 (International Organization for Standardization**	Food Products – Determination of the Total Nitrogen Content by Combustion According to the Dumas Principle and Calculation of the Crude Protein Content. Part 2: Cereals, Pulses and Milled Cereal Products

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Agronomy and Marine Science

Application	Official Association	Official Method
	**Official Italian Method on Soils Analytical Chemistry (Gazzetta Ufficiale)**	Method 248, 1999. Nitrogen, Carbon and Organic Carbon in Soils
	**AOAC (Association of Official Analytical Chemists)**	Official Method 993.13. Nitrogen (Total) in Fertilizers 2.4.02
	**ISO 10694, 1995 UNE 77321:2003**	Soil Quality – Determination of Organic and Total Carbon After Dry Combustion (elementary analysis)
	**ISO 13878, 1998 UNE 77325:2003**	Soil Quality – Determination of Total Nitrogen Content by Dry Combustion (elemental analysis)
	**UNE 77325:2003**	Soil Quality – Determination of Total Sulfur by Dry Combustion
	**UNI EN 13654-2**	Soil Improvers and Growing Media. Determination of Nitrogen by Combustion Method
	**Official Italian Method on Soils Analytical Chemistry (Gazzetta Ufficiale)**	Method 146, 1998 Nuove Norme per la Disciplina Dei Fertilizzanti (New regulations for fertilizer's control)
	**EPA (Environmental Protection Agency)**	Method 440.0, 1997 Determination of Carbon and Nitrogen in Sediments and Particulates of Estuarine/Coastal Waters using Elemental Analysis

Find out more at **thermofisher.com/OEA**

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