



Thermo Scientific FlashSmart Elemental Analyzer

A single CHNS/O, NC, N/Protein Analyzer handling all applications

Benefits

- Outstanding accuracy and precision
- User-friendly operation
- More analysis in less time with lower cost
- High uptime, high productivity

Keywords

Organic elemental analysis, CHNSO, NC, N/Protein, Oxygen

The Thermo Scientific™ FlashSmart™ Elemental Analyzer is built on new and improved technology for total reliability, advanced performance and accuracy. The FlashSmart EA is a fully automated Elemental Analyzer which simplifies the user experience and dramatically improves productivity and efficiency.

The **Thermo Scientific FlashSmart Elemental Analyzer** operates with dynamic combustion of the sample (modified Dumas method) for nitrogen, carbon, hydrogen and sulfur determination, and oxygen determination by pyrolysis.

The Analyzer can be equipped with one or two totally independent furnaces. The double channels can be connected using a single pneumatic circuit. The system also allows the installation of two analytical circuits which are used alternatively and completely automated through the **Thermo Scientific™ MultiValve Control (MVC) Module**. Each analytical circuit can receive its own autosampler.

The MVC Module also allows to reduce helium consumption by switching from helium to nitrogen or argon gas, when the instrument is in Stand-By Mode. Therefore, the cost of analysis is reduced significantly.

The FlashSmart Analyzer copes effortlessly with the wide array of laboratory requirements such as accuracy, day to day reproducibility and high sample throughput. The Analyzer is the ideal solution for all application fields, from demanding 24/7 routine analyses to advanced research applications.



Principle of operation

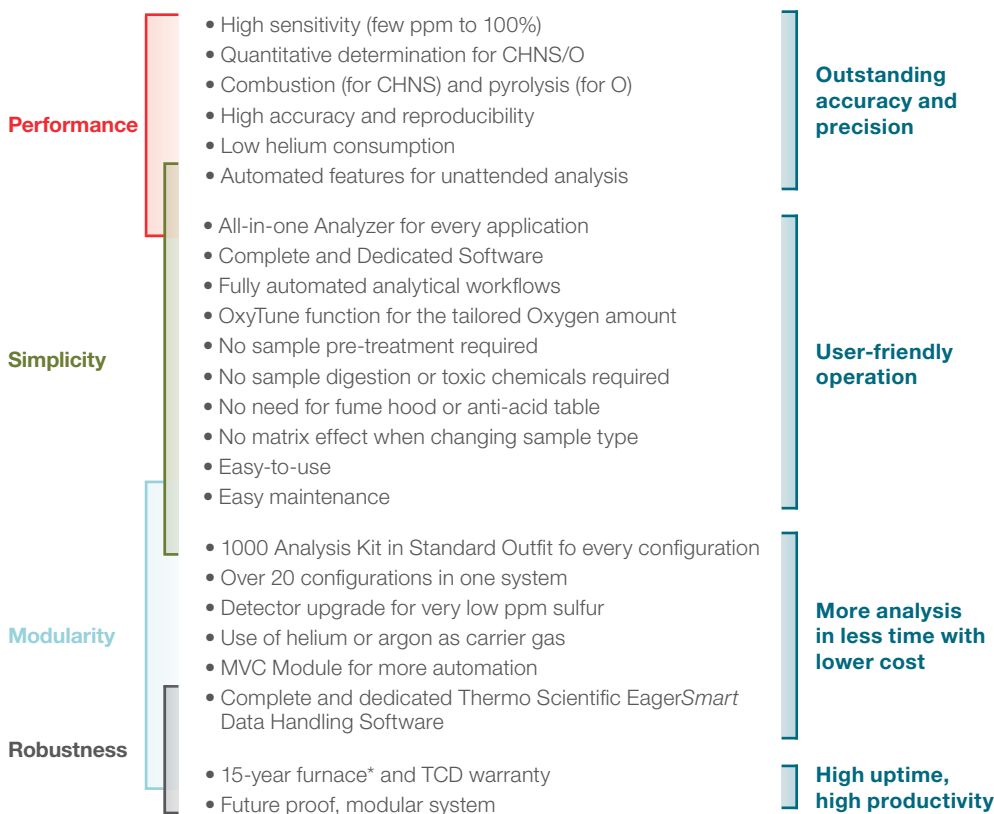
For CHNS determination, samples are weighed in tin containers and introduced into the combustion reactor from the Thermo Scientific™ MAS Plus Autosampler with oxygen.

After combustion, the produced gases are carried by a helium flow through the catalyst and the copper reduction phases, and then optionally swept through the traps. Then, the gases are carried through the GC column, which provides the separation of the combustion gases. Finally, they are detected by a Thermal Conductivity Detector (TCD).

For oxygen determination, the system operates in pyrolysis mode. Samples are weighed in silver containers and introduced into the pyrolysis reactor from the MAS Plus Autosampler. The reactor contains nickel coated carbon maintained at high temperature. The oxygen present in the sample, combined with carbon, forms carbon monoxide which is then chromatographically separated from other products and detected by the TCD Detector.

The Analyzer is fully controlled through the dedicated Thermo Scientific™ EagerSmart™ Data Handling Software which automatically generates a comprehensive report at the end of the analysis.

Experience the benefits



FlashSmart EA configurations

The FlashSmart Analyzer is available in the configurations listed in the table below. The all-in-one FlashSmart Analyzer can be easily adapted for the listed configurations at anytime according to the user analytical requirements.

The EagerSmart Data Handling Software, included as standard with all configurations manages each configuration set-up, including autosamplers, other detectors (FPD Detector), and the MVC Module with no need of additions and upgrades. It is virtually the most complete dedicated software for all Elemental Analysis applications.

Part number	FlashSmart EA configuration	Base unit	MAS Plus Autosampler (32 positions)	1000 analysis standard outfit	MVC Module installed*
112 06100	N/Protein	Double furnaces	1	Nitrogen/Protein	-
112 06170	N Brew	Double furnaces	1 MAS Plus and 1 AS 1310 Liquid Autosampler	N/Protein	-
112 06105	NC Soil	Double furnaces	1	Nitrogen/Carbon	-
112 06110	CHN	Single furnace	1	Carbon/Hydrogen/Nitrogen	-
112 06115	CHNS	Single furnace	1	Carbon/Hydrogen/Nitrogen/Sulfur	-
112 06120	CHN/O	Double furnaces	1	Carbon/Hydrogen/Nitrogen and Oxygen	-
112 06125	CHNS/O	Double furnaces	1	Carbon/Hydrogen/Nitrogen/Sulfur Oxygen	-
112 06130	N Org	Double furnaces	1	Nitrogen	-
112 06135	NC Org	Double furnaces	1	Nitrogen/Carbon	-
112 06140	NCS	Single furnace	1	Nitrogen/Carbon/Sulfur	-
112 06145	N Lubricant	Double furnaces	1	Nitrogen	-
112 06150	CHN/O with MVC Module	Double furnaces	2	Carbon/Hydrogen/Nitrogen and Oxygen	1
112 06155	CHNS/O with MVC Module	Double furnaces	2	Carbon/Hydrogen/Nitrogen/Sulfur and Oxygen	1
112 06160	CHN/CHN with MVC Module	Double furnaces	2	Carbon/Hydrogen/Nitrogen	1
112 06165	CHNS/CHNS with MVC Module	Double furnaces	2	Carbon/Hydrogen/Nitrogen/Sulfur	1

*The MVC Module can be added at a later stage.

FlashSmart EA components description

Component	Description	Photo
MAS Plus Autosampler	<ul style="list-style-type: none"> Up to 32 samples in a single tray, of solid or liquids (absorbed on a dedicated solid inert material) placed in tin containers Additional sample trays available to extend the autosampler capacity up to 125 samples Dedicated viewer which enables real-time monitoring of the flash combustion Simple user maintenance 	
Furnaces	<ul style="list-style-type: none"> One or two totally independent furnaces Straightforward upgrade of single furnace configuration with second furnace Maximum temperature of 1100 °C Decrease by 50% of the furnace temperature in Stand-By Mode Unique serial number for each furnace Full compliance with safety regulations For oxygen determination (by pyrolysis), the same furnace is used 15-year warranty under standard operational conditions 	
Adsorption filters	<ul style="list-style-type: none"> Small and large Adsorption Filters available to trap the combustion gases: CO₂ and H₂O Fast connectors for easy maintenance (no tools required) 	
Gas chromatographic columns	<ul style="list-style-type: none"> Gas separation method No adsorption of combustion gases GC separation column which operates for years without the need for replacement: it is not a consumable Suitable column update according to user application 	
Detectors	<p>Thermal Conductivity Detector (TCD)</p> <ul style="list-style-type: none"> As standard in each FlashSmart Analyzer Housed in a thermally insulated environment (GC oven) and maintained at constant temperature No maintenance required 15-year warranty under standard operating conditions <p>Flame Photometric Detector (FPD)</p> <ul style="list-style-type: none"> For trace sulfur analysis. See FPD Detector table in this document <p>Isotope Ratio Mass Spectrometer (IRMS)</p> <ul style="list-style-type: none"> Upgrade options available for coupling to a Thermo Scientific™ Isotope Ratio Mass Spectrometer For isotope ratio determination of nitrogen, carbon and sulfur by combustion and hydrogen and oxygen by pyrolysis 	
Thermoregulated Electronic Flow Controller Module (EFCt)	<ul style="list-style-type: none"> Prevents variations of the carrier gas flow automatically. Ensures utmost stability of analytical conditions eliminating the need for frequent calibrations Capacity to replay the same analytical, changing reactor, catalyst, crucible, etc Automatic Leak Test through the dedicated EagerSmart Data Handling Software 	
MVC Module	<ul style="list-style-type: none"> Automated switch from the left channel to the right channel or vice-versa Helium savings by switching from helium, to nitrogen or argon when the instrument is in Stand-By Mode Option to add external software controlled functions, for example an automated valve for gas sampling 	

General specification for FlashSmart Analyzer

Item	Description														
FlashSmart EA key-features	<ul style="list-style-type: none"> Built-in helium and oxygen pressure reducers and gauges preventing air diffusion into the pneumatic circuit. Combustion/reduction furnaces with electronic temperature control offering full compliance with the most demanding safety regulations Oxygen determination in the same furnace is used in pyrolysis condition Quick connectors to simplify the reactors connections: no tools needed GC separation column: most reliable gases separation method Detector oven with electronic temperature controller TCD Detector control for constant mean temperature operation Thermo-regulated Electronic Flow Control (EFCt) of helium or argon carrier/reference gas and oxygen flows Automated programmable wake up, start up and shut off functions enhancing the independent operation of the Analyzer and minimizing running cost 														
MAS Plus Autosampler	<ul style="list-style-type: none"> Fully motorized without the requirement of compressed air as utility Power supply: 24 V; 0.7 A max Dimensions: 172 x 245 x 130 mm (W x D x H) Weight: 2.5 kg 														
Utilities	<ul style="list-style-type: none"> Helium or Argon: 99.995% purity He flow: 140 ml/min (measurement channel) and 100 ml/min (reference channel) Oxygen: 99.995% purity (for sample combustion) Helium or argon flow decreased to 10 ml/min in Stand-By Mode while the oxygen flow is cut off Option to use nitrogen or argon instead of helium, when the Analyzer is in Stand-By Mode 														
Accuracy Conformance tested by pure organic elemental analysis standards	<table border="1"> <thead> <tr> <th>Theoretical Value</th> <th>Experimental Value</th> </tr> </thead> <tbody> <tr> <td>0.01% (100 ppm)</td> <td>100 ppm ± 10</td> </tr> <tr> <td>0.10%</td> <td>0.1% ± 0.01</td> </tr> <tr> <td>1.00%</td> <td>1.00% ± 0.02</td> </tr> <tr> <td>10.00%</td> <td>10.00% ± 0.1</td> </tr> <tr> <td>50.00%</td> <td>50.00% ± 0.3</td> </tr> <tr> <td>90.00%</td> <td>90.00% ± 0.3</td> </tr> </tbody> </table>	Theoretical Value	Experimental Value	0.01% (100 ppm)	100 ppm ± 10	0.10%	0.1% ± 0.01	1.00%	1.00% ± 0.02	10.00%	10.00% ± 0.1	50.00%	50.00% ± 0.3	90.00%	90.00% ± 0.3
Theoretical Value	Experimental Value														
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50.00%	50.00% ± 0.3														
90.00%	90.00% ± 0.3														
Measuring range	<ul style="list-style-type: none"> 0.01% (100 ppm) - 100% for solid samples (using TCD Detector) 1-10 ppm (low level) for liquid samples (using TCD Detector) 														
Standard outfit	Each configuration package including all consumables for 1000 analysis														
Thermo Scientific Black Box	<ul style="list-style-type: none"> Site Preparation and Installation Manual Manual FlashSmart Operating Manual EagerSmart Data Handling Software FlashSmart Consumables and Spare Parts Catalog FlashSmart EA videos OEA CookBook samples analysis compendium 														
Power supply	230 V, 50/60 Hz, 1400 VA														
Dimensions	620 x 580 x 500 mm (W x D x H)														
Weight	<ul style="list-style-type: none"> Single furnace base unit: 63 kg (net value) Double furnace base unit without MVC Module: 67 kg (net value) Double furnace base unit with MVC Module: 69 kg (net value) 														
Certification	<table border="1"> <thead> <tr> <th>Low Voltage Directive 2014/35/EU</th> <th>Electromagnetic Compatibility Directive 2014/30/EU</th> </tr> </thead> <tbody> <tr> <td>Standard EN 61010-1:2010 EN 61010-2-010 EN 61010-2-081 CAN/CSA C22.2 No. 61010 -1-12 UL 61010-1:2012</td> <td>Standard 61326-1:2013</td> </tr> </tbody> </table>	Low Voltage Directive 2014/35/EU	Electromagnetic Compatibility Directive 2014/30/EU	Standard EN 61010-1:2010 EN 61010-2-010 EN 61010-2-081 CAN/CSA C22.2 No. 61010 -1-12 UL 61010-1:2012	Standard 61326-1:2013										
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Computer requirements	<ul style="list-style-type: none"> Any PC, including laptop computer Required operating system: Windows 2000, XP or Windows 7, 8 and 10 Hard disk with 1 GB free, at least Monitor: 1024 x 768 or better resolution Printer: any printer supported by the operating system COM port or MOXA Adapter requirements for (if required): <ul style="list-style-type: none"> Instrument control Balance MVC Module Liquid Autosampler 														

Specifications according to the FlashSmart EA configurations

Descriptor	Configuration	Specification
Chemicals consumption	CHN, CHNS, NCS, CHN/O, CHNS/O, CHN/CHN, CHNS/CHNS	<ul style="list-style-type: none"> Oxidation/Reduction Reactor (quartz): 200-300 analyses (according to the sample nature) Pyrolysis Reactor (quartz) for oxygen det.: 200-300 analyses (according to the sample nature) Adsorption Filter (for oxygen determination): greater than 120 analyses (according to the sample nature)
	N Org, NC Org	<ul style="list-style-type: none"> Quartz Reactor (Combustion reactor): greater than 400-500 analyses (according to the sample nature) Quartz Reactor (Reduction reactor): greater than 400-500 analyses (according to the sample nature) Combustion Ashes Removal (by Quartz crucible): approx. 100 analyses (according to the sample nature) Adsorption Filters: greater than 120 analyses (according to the sample nature)
	N Lubricant	<ul style="list-style-type: none"> High Performance Alloy Reactor (Oxidation Reactor) lifetime: 3000 analyses Combustion ashes removal by HPAR crucible: approx. 200-300 analysis High Performance Alloy Reactor (Reduction Reactor) lifetime: 1500 analyses Adsorption Filters: greater than 200 analyses
	NC Soil	<ul style="list-style-type: none"> High Performance Alloy Reactor (Oxidation Reactor) lifetime: greater than 1000 analyses Quartz Reactor (Reduction reactor): 400-500 analyses (according to the sample nature) Combustion Ashes Removal (by HPAR crucible): approx. 100 analyses (according to the sample nature) Adsorption Filter: greater than 120 analyses (according to the sample nature)
	N/Protein, N Brew	<ul style="list-style-type: none"> High Performance Alloy Reactor (Oxidation Reactor) lifetime: greater than 1000 analyses High Performance Alloy Reactor (Reduction Reactor) lifetime: greater than 500-1000 analyses Combustion Ashes Removal (by HPAR crucible): approx. 100 analyses (according to the sample nature) Adsorption Filters: greater than 120 analyses (according to the sample nature)
Sample size	CHN, CHNS, NCS, CHN/O, CHNS/O, CHN/CHN, CHNS/CHNS	From 0.01 mg to 1 gram (depending of sample nature and configuration)
	N Org, NC Org	
	N Lubricant	
	NC Soil	
	N/Protein, N Brew	
Analysis time	CHN, CHNS, NCS, CHN/O, CHNS/O, CHN/CHN, CHNS/CHNS	<ul style="list-style-type: none"> CHN less than 7 minutes CHNS and NCS less than 10 minutes Oxygen less than 5 minutes
	N Org, NC Org	Less than 5 minutes
	N Lubricant, N Brew	Less than 6 minutes (according to the sample nature)
	NC Soil	Less than 5 minutes (according to the sample nature)
	N/Protein	Less than 5 minutes (according to the sample nature)

EagerSmart Data Handling Software

The EagerSmart Data Handling Software manages the FlashSmart EA parameters and performs the digital data acquisition.

It is compatible with Microsoft Windows 2000, XP, Windows 7, 8 and 10 operating systems.

The EagerSmart Data Handling Software coupled to the FlashSmart EA offers:

- Pre-set default methods (instrument, integration, calculation and reporting parameters) available for an easy instrument start-up and running
- User reference library: promptly check your sample quality versus a selected reference
- EasyEager: an advanced system administrator with an integrated simplified user interface
- Automated Leak Check through Electronic Flow Controllers
- Maintenance Control Program
- “Green Light/Red Light”: a green or red light shows at a glance if the data are within the acceptable range. The range is defined by the analyst and it is essential for Quality Control Labs
- Language selection: list of selectable languages available (French, German, Italian, Spanish and other)
- Customized reports

- Data Export/Import:
 - ASCII report file
 - Excel summary result file
 - HTML report file
 - LIMS sample table
- Automated evaluation of the Heat Values (Gross Heat Value, Net Heat Value) and CO₂ Emission Trade
- Optional choice of different N/Protein factors
- Automated Evaluation of the Empirical Formula: a valuable tool for obtaining the empirical formula of the sample with a straightforward function
- Automated and programmable wake-up, start-up, shut-off
- OxyTune® Function: automated oxygen evaluation according to sample type and sample weight
- Density values: for liquid samples to be analyzed with a water density other than 1, for example gasoline, a simple algorithm allows computation of the correct element percentages
- Control of MAS Plus and Liquid Autosamplers
- Control of MVC Module
- Control of FPD Detector
- Automated transfer of the weight from the balance to the software
- 21 CFR Part 11: EagerSmart Data Handling Software allows the set up of Password Access and enables the use of Electronic Signature under a “closed system” format, in compliance with the CFR prerequisites.



Autosampler options

Autosampler for solids and liquids placed in containers	Description	Part number	
MAS Plus Autosampler	Complete MAS Plus Autosampler (Multipurpose Autosampler) with drum n. 1 (32 positions)	251 06100	
	MAS Plus Autosampler optional trays Additional MAS Plus drum n.2 (33-63 position) Additional MAS Plus drum n.3 (64-94 position) Additional MAS Plus drum n.4 (95-125 position)	251 06102 251 06103 251 06104	
	MAS Plus Autosampler complete piston assembly	343 01512	
Liquid autosamplers	Supplied with	Technical specifications	Other features
<p>AI 1310 Autoinjector (PN 251 17571)</p> <p>AS 1310 Liquid Autosampler (PN 251 17572)</p> <ul style="list-style-type: none"> Thermo Scientific™ AI/AS 1310 Series Autosamplers are compatible with all FlashSmart EA configurations and are controlled by the EagerSmart Data Handling Software. Up to 2 units of AI 1310 or AS 1310 can be installed onto the FlashSmart Analyzer. It can be installed on the left or on the right channel by the same mounting bracket and it can be placed on the instrument when the MAS Plus Autosampler is already installed. 	<ul style="list-style-type: none"> 8 positions sample tray for AI 1310 Autosampler 105 positions sample tray for AS 1310 Autosampler 2 ml screw top vials, complete with plastic caps and septa (set of 100) 4 ml solvent vials with caps and septa (set of 5) 50 ml waste bottle Centering guide for the injector on FlashSmart EA FlashSmart EA mounting bracket Cables and connections 10 µL syringe (n.1), 250 µL syringe (n.1) Instruction manual 	<ul style="list-style-type: none"> Types of syringes 10 µL, 50 µL, 100 µL, 250 µL syringes with 50 µL needle. Volumes programming (µL) 0 to 5 µL with 10 µL syringe with increments of 0.1 µL 0 to 125 µL with 250 µL syringe with increments of 0.1 µL External interface Serial Line RS232 Power Supply 24 Vdc through a portable external power supply Electrical characteristic of the supply input 90-264 Vac; 47/63 Hz output 24 Vdc; 70 W Dimensions (H x W x L) AI 1310 approx. 437 x 230 x 250 mm AS 1310 approx. 437x 400 x 250 mm Weight (gross weight) AI 1310: 9 kg AS 1310: 10 kg 	<ul style="list-style-type: none"> Single solvent rinsing: solvent A, B, C, D Combine solvent rinsing: solvent A + B, solvent C + D Solvent rinsing: pre and/or post injection Bubble elimination strokes: 0-15 with pre-set and optimized speed Sample rinsing: 0-15 Sampling depth in vial: bottom/centre Viscosity delay: yes/no Safety switches: activated with front door opening Removable sample tray Fixed guides for quick auto-injector positioning Self alignment over injector and vials Automated recognition of vacant vial
Upgrade option	Description	Included items	
From AI to AS 1310 Liquid Autosampler (PN 190 50299)	This option allows upgrading an existing AI 1310 Autoinjector from 8 position system to the 105 of the AS 1310 Autosampler	<ul style="list-style-type: none"> The support for the rotating carousel with motor, integrated electronics for AS 1310 Autosampler and cables The 105 sample tray Set of 100 vials with complete of caps and septa Instruction manual for AS 1310 Autosampler 	
Manual injection device	Description	Included items	
Liquid/Gas Sampling Device (PN 190 04138)	This device allows the analysis of liquid and gas samples by direct manual injection with a syringe	<ul style="list-style-type: none"> Injector body for the FlashSmart Analyzer Coupling joint for liquid/gas Injection Connection Different septum holders for every FlashSmart Analyzer Syringes: 10 µL, 100 µL, 500 µL Septa BTO 11.5 mm OD (Set of 50) 	

Sample containers and accessories

Item	Description	
Sample containers*	<ul style="list-style-type: none"> Optimized guide for the best choice of containers tailored to your analytical needs, through a detailed specification both for tin and silver containers, used according to the different applications Supplied and protected in dedicated boxes as packages of 50, 100 and 1000, in order to avoid deformation problems 	
Item	Description	Part number
Sample preparation accessories	Sealing device for large tin containers	252 09010
	Sealing device for liquid containers	205 03002
	Pocket sample holder for small containers	240 10053
	Pocket sample holder for large containers	240 10054
	Reactors and crucible holder	240 10057
	Cleaning device for quartz reactor and crucible	276 06010
	Cleaning device for HPAR reactor	205 00625
	Crucible extractor	205 00627
	HPAR extractor	205 00626
	Forceps	205 00500
	Small spatula	205 00600
	Large spatula	205 00620

* For more details, see OEA Consumables Catalogue



Figure 1. Sealing device for large tin containers.

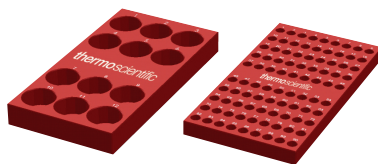


Figure 2. Pocket sample holder for large containers.

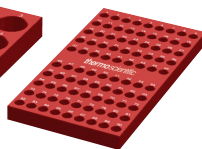


Figure 3. Pocket sample holder for small containers.

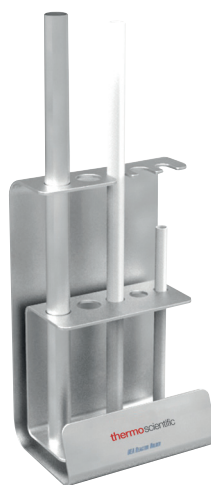


Figure 4. Reactors and crucible holder.



Figure 5. Sealing device for large tin containers.

Total Organic Carbon (TOC) option for solid samples

Description	Specifications
<p>Total Organic Carbon is an essential parameter for soil or for other organic matrix.</p> <p>The kit for TOC analysis (PN 190 04145) allows the removal of all inorganic carbon as carbon dioxide through acidification and heating of the sample in special containers, as indicated in several Official Methods on geological material.</p>	<p>The kit for TOC analysis of solid samples includes:</p> <ul style="list-style-type: none"> • Silver sample containers (set of 100) • Sample holder plate • Electric heater • Syringe 100 µl



FlashSmart EA consumables and spare parts catalogue

The FlashSmart EA Consumables and Spare Parts Catalog provides a complete list of all Consumables, Spare parts, pure organic Standards and Reference Materials used with the FlashSmart Analyzer. Their high grade and purity guarantee the performance of the Analyzer and the quality of the results for all sample matrices in every application field. Consumables and Standards are provided with a Material Safety Data Sheet (MSDS) document, available in several languages and periodically updated.

Item	Description
Consumables and spare parts list	<ul style="list-style-type: none"> • Configuration layout provided showing the description and part numbers (filling of reactors and adsorber filters indications included)
1000 and 5000 analyses kit	<ul style="list-style-type: none"> • Comprehensive list of kits with the description of the consumables according to the configuration of the FlashSmart Analyzer. More details are provided in the FlashSmart Kits options of this document
Reactors	<ul style="list-style-type: none"> • Empty or prepacked reactors as quartz, HPAR and ceramic reactors • Quartz prepacked reactors for CHNS/NCS/S and CHN (sealed in argon gas) • HPAR pre-packed combustion reactor for N Lubricant, N/Protein, NC Soil
Pure analytical standards and reference materials	<ul style="list-style-type: none"> • Large range concentration for 5 elements to be used for the calibration of all sample matrices in every application field • Standards and Reference Materials are provided with a quality certificate, which includes the storage condition and the lifetime of the products • For more details, see OEA Consumables Catalog

FlashSmart EA kits options

Options	Description	Part number
1000 and 5000 Analyses Consumable Kits	1000 Analyses for CHN determination	190 02562
	1000 Analyses for CHNS NCS S determination with Empty Quartz Reactor	190 02564
	1000 Analyses for CHNS NCS S determination with Prepacked Quartz Reactor	190 02565
	1000 Analyses for Oxygen determination	190 02563
	1000 Analyses for N organic determination	190 02566
	1000 Analyses for N Lubricant determination	190 02568
	1000 Analyses for NC organic determination	190 02567
	1000 Analyses for NC Soil determination	190 02561
	1000 Analyses for N/Protein determination	190 02560
	5000 Analyses for N/Protein determination	190 02575
	1000 Analyses for Liquid Samples by AI/AS 1310 Autosamplers	190 02569
Configuration kits	Conversion from NC to NCS determination	190 04245
	Conversion from NC to S determination	190 04240
	Conversion from CHN to CHNS determination	190 04246
	Conversion from CHN/CHNS to oxygen determination	190 04247
Furnaces upgrade kits	Single to Double Furnace	190 04281
	Transformation furnace kit (from 25 to 18 mm, bottom connector 2 x 1 mm)	190 04253
	Transformation furnace kit (from 25 to 18 mm, bottom connector 4 x 2 mm)	190 04254
	Transformation furnace kit (from 18 to 25 mm, bottom connector 6 x 4 mm)	190 04273
	Transformation furnace kit (from 18 to 25 mm, bottom connector 4 x 2 mm)	190 04274
	Furnace Adapter (from 25 to 18 mm reactor diameter)	267 02723
	Seal for Furnace Adapter 25/18 mm	290 03632
	Adapter Plate 18 mm	267 02724
	Adapter Plate 25 mm	267 02725
Helium Thermoregulated Electronic Flow Controller Module (EFCt)	Helium EFCt Module (complete) for FlashSmart models	425 09150
Argon Thermoregulated Electronic Flow Controller Module (EFCt)	Argon Option EFCt Module Kit for N Determination	190 04330
	Argon Option EFCt Module Kit for NC Determination	190 04340
	Argon Option EFCt Module Kit for N and NC Determination	190 04350
	For more details, see OEA Consumables Catalog.	

Balances

Model	Part number	Technical data	Dimensions	FlashSmart EA configuration
Microbalance Mettler WXTS3DU	432 30086	<p>Maximum capacity: 1.2 g / 3.1 g Readability: 0.001 mg / 0.01 mg Repeatability (nominal) (sd): 0.001 mg (1 g) / 0.006 mg (3 g) Typical Repeatability: (200 mg): 0.0008 mg Linearity deviation (test load): 0.02 mg (0.5 g) Minimum weight (200 mg, K=2, U=1): 0.2 mg Typical setting time: < 8 sec</p> <p>Features:</p> <ul style="list-style-type: none"> • Compact draft shield optimizes weighing conditions • Compact trapezium-shaped draft shield optimizes sample viewing angle • Easy and quick cleaning with the removable drip plate 	<p>Weighing cell (W x D x H): 127 x 224 x 86 mm</p> <p>Electronic unit (W x D x H): 178 x 264 x 67 mm</p> <p>Weighing Pan Diameter 32 mm</p> <p>Balance weight 3.4 kg</p>	CHN, CHNS, NCS, CHN/O, CHNS/O, CHN/CHN CHNS/CHNS, N Org, N Lubricant, NC Org, NC Soil
Ultramicrobalance Mettler XPR2U	432 30087	<p>Maximum capacity: 2.1 g Readability: 0.0001 mg Repeatability (5% load) (sd): 0.00015mg Minimum sample weight (5% load, k=2, U=1%): 0.03 mg USP minimum sample weight (5% load, k=2, U=0.10%): 0.3 mg</p> <p>Features:</p> <ul style="list-style-type: none"> • Double display: Touchscreen with customizable weighing operations. Smart LCD on top of weighing chamber with tare/zero/open-close • Balance ready StatusLight™ • LevelControl: Level warning with graphical levelling guide 	<p>Weighing cell (W x D x H): 123 x 356 x 180 mm</p> <p>Weighing Pan Diameter 16 mm</p> <p>Balance weight 5.3 kg</p>	CHN, CHNS, NCS, CHN/O, CHNS/O, CHN/CHN CHNS/CHNS
<i>Available under request</i>				
Analytical Balance Mettler ME54	BRE0014334	<p>Maximum Load: 52 g Readability: 0.1 mg Repeatability (std dev.): 0.1 mg Linearity: 0.2 mg</p>	<p>Dimensions (W x D x H): 210 x 344 x 344 mm</p> <p>Weighing pan Diameter: 90 mm</p> <p>Balance weight 4.7 kg</p>	N/Protein N Brew NC Soil

MultiValve Control (MVC) Module

Item	Specifications	Requirements
<p>The MultiValve Control (MVC) Module allows:</p> <ul style="list-style-type: none"> Automated switch from the left channel to the right channel or vice versa. Reduced helium (or argon) consumption by switching from helium (or argon) to nitrogen or argon when the system is in Stand-By Mode. Optional insert, using the EagerSmart Data Handling Software, an external command, for example an actuator for a gas sampling valve. The MVC Module can be installed at a later stage with the dedicated Upgrade Kit (PN 190 02473). 	<p>Dimensions (mm) (W x D x H): 204 x 161 x 100 Weight: 2.4 kg</p>	<p>Host Software EagerSmart Data Handling Software</p>



FPD Detector

Description	Specification	Requirements
<p>The OEA/FPD Option (PN 432 10145) increases the sensitivity for sulfur determination by using a Flame Photometric Detector (FPD) coupled with the FlashSmart Analyzer.</p> <p>This FPD option can be applied to any FlashSmart EA configuration and it allows the determination of trace sulfur in both liquid and solid compounds.</p> <p>The OEA/FPD Option includes:</p> <ul style="list-style-type: none"> • FPD Detector module including the FPD Detector and the pneumatic circuit to control the detector gases flows (PN 432 09886) • FPD Detector control module controlling the detector parameters (PN 432 098 86) • FPD Detector standard outfit (PN 165 00110) 	<p>FPD Detector Performance</p> <ul style="list-style-type: none"> • Low Limit: 5-10 ppm sulfur • Max limit: 0.5% (5.000 ppm) sulfur • Detector response: quadratic <p>FPD Detector General</p> <ul style="list-style-type: none"> • Temperature: 150 °C (min 100 °C - max 350 °C) • Heating Mode: Heater Cartridge • Carrier Gas: helium • FPD Detector flame: hydrogen/air • Pneumatic Gas Control with pressure regulators • Sulfur Wavelength Filter: 394 nm • PMT (PhotoMultiplier Tube) voltage: low 800V high 900V selectable <p>Dimensions and Weight (mm)</p> <ul style="list-style-type: none"> • Gas Control Box: 177 x 235 x 287 (L x H x D) • FPD Detector Control Module: 180 x 85 x 485 (L x H x D) • Weight Gas Control Box: 5 kg • FPD Detector Control Module: 6 kg 	<p>Gas Requirements</p> <p>Helium GC Grade, Air 99.995%, Hydrogen 99.995%</p> <p>Power Requirements</p> <p>120/230 Vac 50/60</p> <p>Host Hardware Requirements</p> <p>Operating system: Windows 2000, XP, 7, 8 and 10</p> <p>Host Software Requirements</p> <p>EagerSmart Data Handling Software</p>



FlashSmart EA qualification

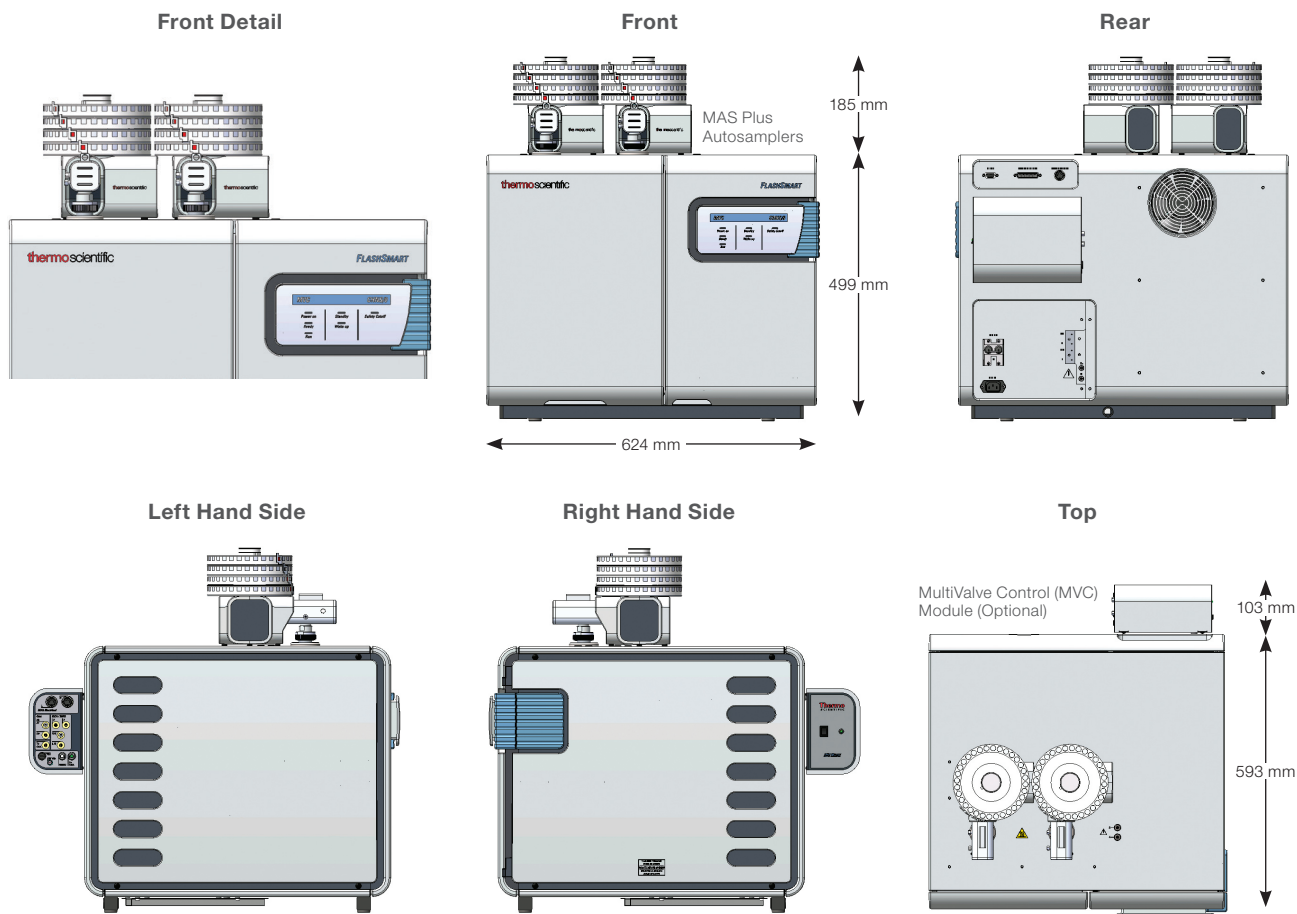
- Qualification is a process aimed at evaluating and certifying the performance of the instrument.
- The process includes signing, dating and executing a set of qualifications.
- FlashSmart EA and the EagerSmart Data Handling Software are qualified for the installation (Installation Qualifications IQ) and operation (Operation Qualification OQ).
- The Qualification Package folder is available for all configurations. According to the specific qualification needed, the dedicated kit is available for ordering.
- The kits include consumables, standards, adsorption filter and GC column for the selected configuration. See table for part number references.

For the FlashSmart EA Qualification the following items are required:

Description	Part number
FlashSmart EA Qualification Package folder	199 10022
Qualification Kit:	
CHN	190 04280
CHNS	190 04285
Oxygen	190 04290
N org	190 04295
NC org	190 04300
N Lubricant	190 04360
NCS	190 04305
NC Soil	190 04310
N/Protein	190 04315
N Brew	190 04320
Al/AS 1310	190 04325



Thermo Scientific FlashSmart Elemental Analyzer dimensions



Dimensions

620 x 580 x 500 mm (W x D x H)

Power supply

230 V, 50/60 Hz, 1400 VA

Weight

Single furnace base unit: 63 kg (net value)
 Double furnace base unit without MVC Module: 67 kg (net value)
 Double furnace base unit with MVC Module: 67 kg (net value)

Find out more at thermofisher.com/OEA