



THERMOGRAVIMETRIC ANALYZER

TGA THERMOSTEP

Thermogravimetry is a standard method to analyze organic, inorganic and synthetic materials. Thermogravimetric analysis in general means the measurement of the weight loss during a user-defined temperature or heating process.

ELTRA's TGA Thermostep is a thermogravimetric analyzer which determines various parameters such as moisture, volatiles and ash at user-defined temperatures and atmospheres in a single analysis. The thermogravimetric analyzer TGA Thermostep simultaneously analyzes up to 19 samples with sample weights up to 5 g and can be operated at temperatures up to 1000 °C.

A special feature of the TGA Thermostep is the management of crucible covers. The thermogravimetric analyzer can place and remove the covers of the crucibles during analysis. This feature allows for example the precise determination of volatile content in coal and coke.

BENEFITS

- | Measurement of up to 19 samples in one analysis
- | Sample weights of up to 5 g
- | Fast heating rates, accurate temperature control
- | High-performance, precise weighing cell
- | Automatic placing and lifting of crucible covers
- | Robust design allows for use in laboratories and production



THERMOGRAVIMETRIC ANALYZER THERMOSTEP TGA

RELIABLE AND FLEXIBLE

ELTRA TGA analyzers are an ideal alternative to standard laboratory ovens and muffle furnaces for thermogravimetric analysis. Thanks to a programmable furnace that is connected to an integrated balance, heating and weighing are combined in one instrument. This saves time-consuming manual work and allows for high sample throughput. In addition, typical parameters such as moisture, ash and volatiles can be determined in one analysis run.

The TGA Thermostep processes up to 19 different samples, typically weighing between 500 mg and 5 g, in one analysis cycle. The surrounding atmosphere and temperature of up to 1,000 °C within the heating chamber can be freely defined by the user during analysis to create a standard operating procedure. The crucible lids, covering of the samples, can be raised or lowered at each stage of the analysis, thus allowing for safe and ASTM-compliant determination of volatiles in coal samples.



Encapsulated weighing cell

PRECISE RESULTS

HIGH-PERFORMANCE ANALYSIS TECHNOLOGY

The TGA Thermostep is a powerful thermogravimetric analyzer characterized by robust design, high precision and flexibility. It is possible to apply different atmospheres and to use sample weights of up to 5 g. The Thermostep reliably and efficiently measures parameters such as moisture, ash and volatiles according to a user-defined SOP.

PURGING GAS

The TGA Thermostep is very flexible with regards to the purging gas used. At each stage of the analysis either nitrogen, oxygen or surrounding atmosphere can be selected. In the latter, the surrounding atmosphere penetrates into the TGA Thermostep, gently oxidizing the samples.

TEMPERATURE CONTROL

The furnace temperature is monitored by two thermocouples which are not encapsulated. One thermocouple monitors the temperature inside the furnace, the other monitors the temperature within the heating element. Due to the absence of the encapsulation the heating can be controlled quickly and precisely.

ENCAPSULATED WEIGHING CELL

The latest TGA Thermostep generation features an encapsulated weighing cell with 0.1 mg resolution providing highly precise measurements. The encapsulation isolates the weighing cell from the ambient atmosphere and is extremely stable. The weighing cell is connected to the furnace by a ceramic spindle with pedestal on which the crucibles are placed.

HIGH-CAPACITY HEATING ELEMENTS



COOLING



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SIMPLE OPERATION YIELDS QUICK RESULTS

Operation of the TGA Thermostep is simple, convenient and safe. After selecting the Standard Operating Procedure (SOP) in the PC, the sample ID's can be entered into the software. The samples are then weighed in the crucible at the position assigned to the sample ID in the carousel. After one sample has been weighed, the carousel automatically rotates to the next position and the next registered sample can then be weighed in the crucible. Alternatively, a carousel filled with samples which has been weighed externally, can be placed into the analyzer.

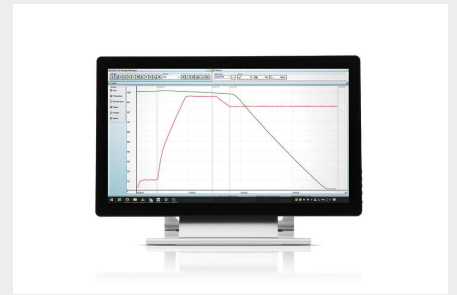
It is also possible to position a second carousel with crucible lids above the crucibles. Once the analysis is finished, a new cycle can be started after a short cool-down period.



Weighing the sample



Option: Crucible lids



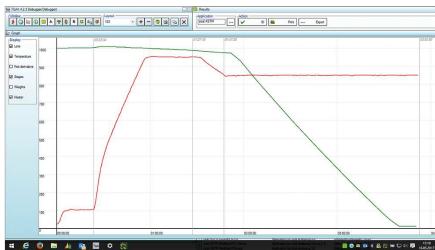
Display of analysis results

THERMOGRAVIMETRIC ANALYZER THERMOSTEP TGA

PC CONTROL WITH WINDOWS®-BASED SOFTWARE

The ELTRA TGA Thermostep software provides all necessary features for a fast, easy, safe and reliable thermogravimetric analysis.

ANALYSIS GRAPH



The TGA software can provide different content of the TGA measurement

- | Weight loss graph
- | Absolute weights
- | First deviation of weight loss
- | Temperature graph
- | Measuring stages

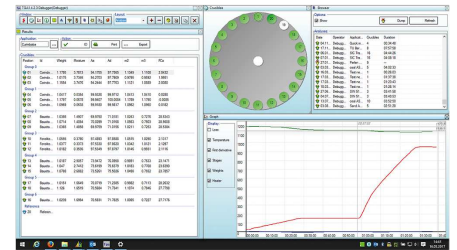
ANALYSIS RESULTS

Sample	Weight	Time	Temp	Loss	Residue
Sample 1	1.000	10.00	1000	0.000	1.000
Sample 1	1.000	20.00	1000	0.000	1.000
Sample 1	1.000	30.00	1000	0.000	1.000
Sample 1	1.000	40.00	1000	0.000	1.000
Sample 1	1.000	50.00	1000	0.000	1.000
Sample 1	1.000	60.00	1000	0.000	1.000
Sample 1	1.000	70.00	1000	0.000	1.000
Sample 1	1.000	80.00	1000	0.000	1.000
Sample 1	1.000	90.00	1000	0.000	1.000
Sample 1	1.000	100.00	1000	0.000	1.000
Sample 1	1.000	110.00	1000	0.000	1.000
Sample 1	1.000	120.00	1000	0.000	1.000
Sample 1	1.000	130.00	1000	0.000	1.000
Sample 1	1.000	140.00	1000	0.000	1.000
Sample 1	1.000	150.00	1000	0.000	1.000
Sample 1	1.000	160.00	1000	0.000	1.000
Sample 1	1.000	170.00	1000	0.000	1.000
Sample 1	1.000	180.00	1000	0.000	1.000
Sample 1	1.000	190.00	1000	0.000	1.000
Sample 1	1.000	200.00	1000	0.000	1.000
Sample 1	1.000	210.00	1000	0.000	1.000
Sample 1	1.000	220.00	1000	0.000	1.000
Sample 1	1.000	230.00	1000	0.000	1.000
Sample 1	1.000	240.00	1000	0.000	1.000
Sample 1	1.000	250.00	1000	0.000	1.000
Sample 1	1.000	260.00	1000	0.000	1.000
Sample 1	1.000	270.00	1000	0.000	1.000
Sample 1	1.000	280.00	1000	0.000	1.000
Sample 1	1.000	290.00	1000	0.000	1.000
Sample 1	1.000	300.00	1000	0.000	1.000
Sample 1	1.000	310.00	1000	0.000	1.000
Sample 1	1.000	320.00	1000	0.000	1.000
Sample 1	1.000	330.00	1000	0.000	1.000
Sample 1	1.000	340.00	1000	0.000	1.000
Sample 1	1.000	350.00	1000	0.000	1.000
Sample 1	1.000	360.00	1000	0.000	1.000
Sample 1	1.000	370.00	1000	0.000	1.000
Sample 1	1.000	380.00	1000	0.000	1.000
Sample 1	1.000	390.00	1000	0.000	1.000
Sample 1	1.000	400.00	1000	0.000	1.000
Sample 1	1.000	410.00	1000	0.000	1.000
Sample 1	1.000	420.00	1000	0.000	1.000
Sample 1	1.000	430.00	1000	0.000	1.000
Sample 1	1.000	440.00	1000	0.000	1.000
Sample 1	1.000	450.00	1000	0.000	1.000
Sample 1	1.000	460.00	1000	0.000	1.000
Sample 1	1.000	470.00	1000	0.000	1.000
Sample 1	1.000	480.00	1000	0.000	1.000
Sample 1	1.000	490.00	1000	0.000	1.000
Sample 1	1.000	500.00	1000	0.000	1.000
Sample 1	1.000	510.00	1000	0.000	1.000
Sample 1	1.000	520.00	1000	0.000	1.000
Sample 1	1.000	530.00	1000	0.000	1.000
Sample 1	1.000	540.00	1000	0.000	1.000
Sample 1	1.000	550.00	1000	0.000	1.000
Sample 1	1.000	560.00	1000	0.000	1.000
Sample 1	1.000	570.00	1000	0.000	1.000
Sample 1	1.000	580.00	1000	0.000	1.000
Sample 1	1.000	590.00	1000	0.000	1.000
Sample 1	1.000	600.00	1000	0.000	1.000
Sample 1	1.000	610.00	1000	0.000	1.000
Sample 1	1.000	620.00	1000	0.000	1.000
Sample 1	1.000	630.00	1000	0.000	1.000
Sample 1	1.000	640.00	1000	0.000	1.000
Sample 1	1.000	650.00	1000	0.000	1.000
Sample 1	1.000	660.00	1000	0.000	1.000
Sample 1	1.000	670.00	1000	0.000	1.000
Sample 1	1.000	680.00	1000	0.000	1.000
Sample 1	1.000	690.00	1000	0.000	1.000
Sample 1	1.000	700.00	1000	0.000	1.000
Sample 1	1.000	710.00	1000	0.000	1.000
Sample 1	1.000	720.00	1000	0.000	1.000
Sample 1	1.000	730.00	1000	0.000	1.000
Sample 1	1.000	740.00	1000	0.000	1.000
Sample 1	1.000	750.00	1000	0.000	1.000
Sample 1	1.000	760.00	1000	0.000	1.000
Sample 1	1.000	770.00	1000	0.000	1.000
Sample 1	1.000	780.00	1000	0.000	1.000
Sample 1	1.000	790.00	1000	0.000	1.000
Sample 1	1.000	800.00	1000	0.000	1.000
Sample 1	1.000	810.00	1000	0.000	1.000
Sample 1	1.000	820.00	1000	0.000	1.000
Sample 1	1.000	830.00	1000	0.000	1.000
Sample 1	1.000	840.00	1000	0.000	1.000
Sample 1	1.000	850.00	1000	0.000	1.000
Sample 1	1.000	860.00	1000	0.000	1.000
Sample 1	1.000	870.00	1000	0.000	1.000
Sample 1	1.000	880.00	1000	0.000	1.000
Sample 1	1.000	890.00	1000	0.000	1.000
Sample 1	1.000	900.00	1000	0.000	1.000
Sample 1	1.000	910.00	1000	0.000	1.000
Sample 1	1.000	920.00	1000	0.000	1.000
Sample 1	1.000	930.00	1000	0.000	1.000
Sample 1	1.000	940.00	1000	0.000	1.000
Sample 1	1.000	950.00	1000	0.000	1.000
Sample 1	1.000	960.00	1000	0.000	1.000
Sample 1	1.000	970.00	1000	0.000	1.000
Sample 1	1.000	980.00	1000	0.000	1.000
Sample 1	1.000	990.00	1000	0.000	1.000
Sample 1	1.000	1000.00	1000	0.000	1.000

The results table displays the current available measurement data.

- | Display of new results after every measuring step
- | Results can be calculated as analysed or on dry base
- | Optional grouping for multiple measurements of one sample type

USER DEFINED SCREEN LAYOUT



For a better overview on the current analysis status, the user can create an own layout of the screen

- | Measuring graphs
- | Current results
- | Position of the carousel
- | Diagnosis screens

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APPLICATIONS

Due to the flexible application management the TGA Thermostep can measure TGA parameters in many samples like coal, coke, building materials, food ...

ANALYSIS OF COAL & COKE



The TGA Thermostep can determine the parameter moisture, volatile and ash in one analysis cycle due the automatic placing and removing of lids. The TGA is compliant to ASTM D 7582.

ANALYSIS OF BUILDING MATERIALS



Building materials require the measurement of moisture and loss on ignition (LOI). The LOI can indicate the presence of organic matter or carbonates.

ANALYSIS OF FOOD



Some foods like pet foods, biscuits, or milk require the measurement of dry mass and ash content. Due to the encapsulated weighing cell even the ash content of flour could be measured safe and precise.

FUNCTIONAL PRINCIPLE

Operation of the thermogravimetric analyzer TGA Thermostep is simple and convenient. The measurement process has to be defined once regarding the used temperatures, atmospheres and heating ranges. To start the thermogravimetric analysis, a predefined process simply has to be chosen in the software and the sample has to be weighed into the crucible. All further steps are processed automatically. All data processing, control of the measurement process and calculating of the result is done by an external PC with Windows®-based software. Thermogravimetric analysis of moisture, volatile and ash content requires about 4 hours.

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TECHNICAL DATA

Measured elements	ash content, moisture, volatiles
Samples	inorganic, organic, synthetic
Field of application	agriculture, biology, chemistry / plastics, coal / power plant, construction materials, environment / recycling, food, geology / mining, glass / ceramics, medicine / pharmaceuticals
Furnace	resistance heated ceramic furnace, programmable in 1 °C steps from 50 °C up to 1000 °C
Detection method	balance
Max. number of samples	19 crucibles + 1 reference crucible
Balance resolution	0.0001 g
Balance precision	0.02 % RSD
Gas required	depends on application: oxygen 99.9 % pure (2 - 4 bar) and, or nitrogen 99.9 % pure (2 - 4 bar) and air 99.5 % (5 - 6 bar)
Power requirements	230 V, 50/60 Hz, max. 32 A
Dimensions (W x H x D)	55 x 52 x 62 cm
Weight	~ 65 kg
Required equipment	PC, monitor, external exhaust (exhaust diameter: 100 mm / blower with 4m ³ /min)

www.eltra.com/thermostep

ORDER DATA

ELTRA TGA THERMOSTEP

(Please order PC, monitor separately / not for sale in USA)

88100-3001



TGA Thermostep with 2 carousels, 20 ceramic crucibles and 20 lids

REQUIRED ACCESSORIES

PC, MONITOR

71015-1000

Computer with Intel Core i5-8400 Processor, 256 GB SSD; 8 GB RAM; Windows 10 operating system; keyboard; mouse

88400-0584

Monitor, TFT (23.8")

FURTHER OPTIONS AND CONSUMABLES

ACCESSORIES (HARDWARE)

72070

Oxygen regulator

72080

Nitrogen regulator

26085

External weighing station

26102

External weighing station with balance

26794



Crucible carousel (ceramic)

26795

Lid carousel (ceramic)

CRUCIBLES, LIDS

26063



Ceramic crucibles

26053



Ceramic lid

TOOLS FOR OPERATION: SPATULAS, TWEEZERS, TONGS AND OTHER

23111		Spatula, 1 piece, L size
88400-0229		Tweezers (160 mm), curved, 1 piece
88400-0472		Tweezers (145 mm), straight, 1 piece
88400-0475		Set with 6 spatula and 1 tweezers, for multiple weighing procedures
88400-0477		Weighing boat, 1 piece, for weighing and usage of granulates
90145		Tongs for ceramic crucibles and boats, 220 mm, 1 piece

TOOLS FOR MAINTENANCE

71010		Brush, 16 mm, 1 piece, for cleaning balance from dust
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CALIBRATION MATERIALS

**Calibration materials may show slight variations depending on the current lot.
To see the current certification please visit www.ELTRA.com.**

CALCIUM OXALATE

90700-1040		Calcium oxalate, 50 g
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COAL, PREMIUM: CERTIFIED C/H/N/S; ASH, VOLATILE CONTENT

92550-3010		Coal, premium, 50 g, < 1.0 % S
92550-3020		Coal, premium, 50 g, ~ 1 % S
92550-3040		Coal, premium, 50 g, 1.0 – 3.0 % S
92550-3060		Coal, premium, 50 g, > 3.0 % S

COKE, PREMIUM: CERTIFIED C/H/N/S; ASH, VOLATILE CONTENT

92560-3010



Coke, premium, 50 g

PET COKE, PREMIUM, C/H/N/S, ASH, VOLATILE CONTENT CERTIFIED

92570-3020

Pet coke, premium, 50 g, ~ 1 % S

92570-3040

Pet coke, premium, 50 g, ~ 1 % S

Please note: The TGA Thermostep requires PC, monitor which have to be ordered separately