



ANALIZATOR TERMOGRAWIMETRYCZNY

TGA THERMOSTEP

**Termograwimetria jest standardową metodą analizy materiałów organicznych, nieorganicznych i syntetycznych. Ogólnie analiza termograwimetryczna polega na pomiarze ubytku masy próbki w zdefiniowanej przez użytkownika temperaturze lub procesie grzania.**

ELTRA TGA Thermostep jest urządzeniem do oznaczania różnych parametrów takich jak wilgoć, części lotne i popiół w odpowiednich temperaturach i zdefiniowanej atmosferze gazu podczas każdego cyklu. TGA Thermostep analizuje równocześnie do 19 próbek z naważką do 5 g i może pracować z temperaturą do 1000 °C.

Cechą szczególną TGA Thermostep jest możliwość zarządzania pokrywkami tygli. Urządzenie może automatycznie zakładać i zdejmować pokrywki podczas analizy. Właściwość ta pozwala na przykład zwiększyć precyzję oznaczania części lotnych w węglu i koksie.

#### **ZALETY**

- | 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



ANALIZATOR TERMOGRAWIMETRYCZNY 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



ANALIZATOR TERMOGRAWIMETRYCZNY THERMOSTEP TGA

## 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.

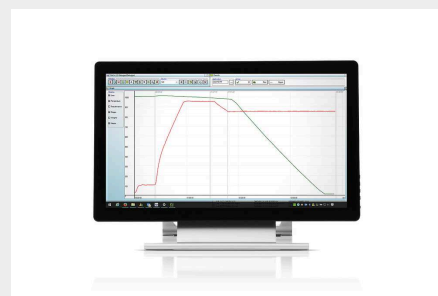
It is also possible to position a second carousel with crucible lids above the crucibles. Once the analysis is finished, a new cycle can be started after a short cool-down period.



Weighing the sample



Option: Crucible lids



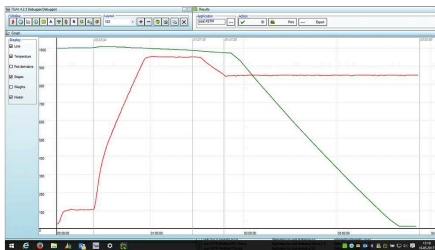
Display of analysis results

## ANALIZATOR TERMOGRAWIMETRYCZNY THERMOSTEP TGA

### PC CONTROL WITH WINDOWS<sup>®</sup>-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

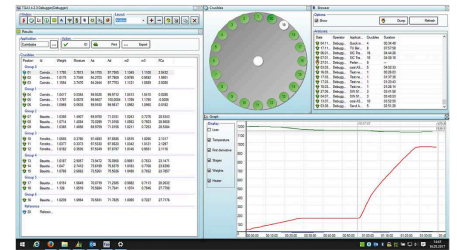
#### ANALYSIS RESULTS

| Sample   | Weight | Temperature | Time | Weight Loss | Temperature |
|----------|--------|-------------|------|-------------|-------------|
| Sample 1 | 1.000  | 1000        | 0.00 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.01 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.02 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.03 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.04 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.05 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.06 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.07 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.08 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.09 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.10 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.11 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.12 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.13 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.14 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.15 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.16 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.17 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.18 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.19 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.20 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.21 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.22 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.23 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.24 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.25 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.26 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.27 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.28 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.29 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.30 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.31 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.32 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.33 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.34 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.35 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.36 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.37 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.38 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.39 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.40 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.41 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.42 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.43 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.44 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.45 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.46 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.47 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.48 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.49 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.50 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.51 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.52 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.53 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.54 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.55 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.56 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.57 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.58 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.59 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.60 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.61 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.62 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.63 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.64 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.65 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.66 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.67 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.68 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.69 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.70 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.71 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.72 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.73 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.74 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.75 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.76 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.77 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.78 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.79 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.80 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.81 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.82 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.83 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.84 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.85 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.86 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.87 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.88 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.89 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.90 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.91 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.92 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.93 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.94 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.95 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.96 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.97 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.98 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 0.99 | 0.000       | 1000        |
| Sample 1 | 1.000  | 1000        | 1.00 | 0.000       | 1000        |

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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## APLIKACJE

Due to the flexible application management the TGA Thermostep can measure TGA parameters in many samples like coal, koks, materiały budowlane, żywność ...

### 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 encapsuled weighing cell even the ash content of flour could be measured safe and precise.

## ZASADA DZIAŁANIA

Obsługa TGA Thermostep jest prosta i wygodna. Przebieg procesu pomiaru: temperatury, atmosfery gazu, sposobu grzania, musi zostać zdefiniowany wcześniej. Aby rozpocząć analizę wystarczy uruchomić wcześniej zdefiniowaną aplikację i naważyć próbki do tygli. Wszystkie następne działania odbywają się automatycznie. Wszystkie dane procesu i obliczenia wyników są realizowane za pomocą zewnętrznego komputera PC opartego na systemie Windows®. Oznaczenie wilgoci, części lotnych i popiołu zajmuje około 4 godzin.

## ANALIZATOR TERMOGRAWIMETRYCZNY THERMOSTEP TGA

**DANE TECHNICZNE**

|                                     |                                                                                                                                                                                              |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Parametry mierzone</b>           | części lotne, popiół, wilgoć                                                                                                                                                                 |
| <b>Próbki</b>                       | nieorganiczne, organiczne, syntetyczne                                                                                                                                                       |
| <b>Dziedzina zastosowania</b>       | biologia, chemia / tworzywa sztuczne, geologia / górnictwo, materiały budowlane, medycyna / farmaceutyki, rolnictwo, szkło / ceramika, węgiel / elektrownie, środowisko / recykling, żywność |
| <b>Piec</b>                         | ceramiczny piec oporowy z programowaną temperaturą co 1 °C od 50 °C do 1000 °C                                                                                                               |
| <b>Metoda detekcji</b>              | wagowa                                                                                                                                                                                       |
| <b>Maksymalna ilość próbek</b>      | 19 tygli + 1 tygiel referencyjny                                                                                                                                                             |
| <b>Rozdzielczość wagi</b>           | 0.0001 g                                                                                                                                                                                     |
| <b>Dokładność wagi</b>              | 0.02 % RSD                                                                                                                                                                                   |
| <b>Wymagane gazy</b>                | w zależności od aplikacji:<br>tlen 99.9 % (2 - 4 bar)<br>oraz, lub azot 99.9 % (2 - 4 bar)<br>sprężone powietrze 99.5 % (5 - 6 bar)                                                          |
| <b>Wymagane dot. zasilania</b>      | 230 V, 50/60 Hz, max. 32 A                                                                                                                                                                   |
| <b>Wymiary (szer. x wys. x gł.)</b> | 55 x 52 x 62 cm                                                                                                                                                                              |
| <b>Waga</b>                         | ~ 65 kg                                                                                                                                                                                      |
| <b>Wymagane wyposażenie</b>         | PC, monitor, zewnętrzny wyciąg (średnica wyciągu: 100 mm / dmuchawa o wydajności 4m <sup>3</sup> /min)                                                                                       |

[www.eltra.com/thermostep](http://www.eltra.com/thermostep)



## ZAMÓWIENIA

### ELTRA TGA THERMOSTEP

**(Prosimy zamawiać PC, monitor oddzielnie / nie do sprzedaży w USA)**

88100-3001



TGA Thermostep z 2 karuzelami, 20 tyglami ceramicznymi i 20 pokrywkami

### WYMAGANE AKCESORIA

#### PC, MONITOR

71015-1000

Komputer z procesorem Intel Core i5-8400, dysk SSD 256 GB; pamięć RAM 8 GB; system operacyjny Windows 10; klawiatura; myszka

88400-0584

Monitor, TFT (23.8")

### INNE OPCJE I MATERIAŁY EKSPLOATACYJNE

#### AKCESORIA (HARDWARE)

72070

Reduktor tlenowy

72080

Reduktor azotu

26085

Stacja ważenia zewnętrznego

26102

Stacja ważenia zewnętrznego z wagą

26794



Karuzela do tygli (ceramiczna)

26795

Lid carousel (ceramic)

#### TYGLE, POKRYWKI

26063



Tygle ceramiczne

26053



Pokrywka ceramiczna

#### NARZĘDZIA DO PRACY: SZPATUŁKI, PĘSETY, SZCZYPCE I INNE

|            |                                                                                   |                                                                |
|------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------|
| 23111      |  | Szpatułka, 1 szt., Rozmiar L                                   |
| 88400-0229 |  | Pęseta (160 mm), zakrzywiona, 1 szt.                           |
| 88400-0472 |  | Pęseta (145 mm), prosta, 1 szt.                                |
| 88400-0475 |  | Zestaw 6 szpatulek i 1 pęseta, dla wielu procedur ważenia      |
| 88400-0477 |  | Łódka do naważania, 1 szt., do ważenia i stosowania granulatów |
| 90145      |  | Szczypce do tygli i łodek ceramicznych, 220 mm, 1 szt.         |

#### NARZĘDZIA DO KONSERWACJI

|       |                                                                                    |                                                    |
|-------|------------------------------------------------------------------------------------|----------------------------------------------------|
| 71010 |  | Pędzel, 16 mm, 1 szt., do oczyszczania wagi z pyłu |
|-------|------------------------------------------------------------------------------------|----------------------------------------------------|

## MATERIAŁY KALIBRACYJNE

**Materiały kalibracyjne mogą wykazywać niewielkie różnice w zależności od aktualnej partii. -Aby zapoznać się z aktualną certyfikacją, prosimy odwiedzić stronę [www.ELTRA.com](http://www.ELTRA.com).**

#### SZCZAWIAN WAPNIA

|            |                                                                                     |                        |
|------------|-------------------------------------------------------------------------------------|------------------------|
| 90700-1040 |  | Szczawian wapnia, 50 g |
|------------|-------------------------------------------------------------------------------------|------------------------|

#### WĘGIEL, PREMIUM: CERTYFIKOWANY C/H/N/S; POPIÓŁ, ZAWARTOŚĆ CZĘŚCI LOTNYCH

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

KOKS, PREMIUM: CERTYFIKOWANY C/H/N/S; POPIÓŁ, ZAWARTOŚĆ CZĘŚCI LOTNYCH

92560-3010



Koks, premium, 50 g

KOKS NAFTOWY, PREMIUM, C/H/N/S, POPIÓŁ, ZAWARTOŚĆ CZĘŚCI LOTNYCH CERTYFIKOWANA

92570-3020

Koks naftowy, premium, 50 g, > 1 % S

92570-3040

Koks naftowy, premium, 50 g, > 1 % S

**Uwaga: TGA Thermostep wymaga komputera i monitora, które należy zamówić oddzielnie.**