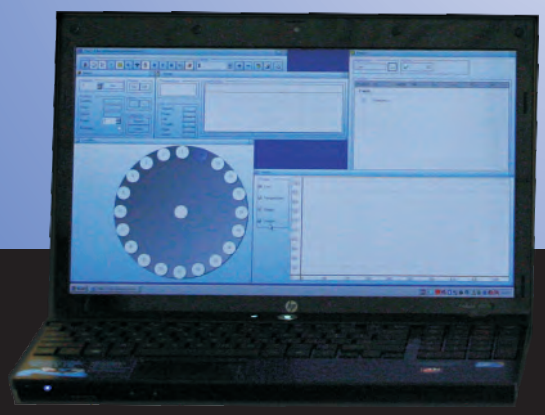
THERMOSTEP

ELTRA
Analysers made in Germany



Thermogravimetric analyser

- Furnace 50-1000°C with 1°C resolution for 19 samples
- Balance with 0.0001 gram sensivity, adapted for high temperatures
- 2 carousels, 20 crucibles and 20 crucible covers
- 2 Thermocouples for precise temperaturecontrol
- PC controlled
- PC with software, keyboard and mouse, TFT monitor
- Ergonomic design

TÜV CERT
DIN EN ISO 9001
Certificate: 01 100 0020005

Thermogravimetry is based on the continuous recording of mass variation of a sample specifically related to temperature change.
The method can be used to analyse organic, inorganic and synthetic materials.

The Eltra Thermostep Advantages

Productivity
- Ease of use easy to load samples.
- Efficient cooling system and heater design rapid cool down from 300°C.

Versatility
- Automatic closing & opening of crucible lids during analysis at a user defined temperature.
- Change of atmosphere, oxygen or nitrogen at a user defined temperature.

Low Cost of Ownership
- User-friendly innovative Windows® based software.
- Import and export of data to LIMS
- Flexibility control of four Thermosteps with one PC
- High precision 4 place balance.
- Accurate temperature control.
- High temperature, low cost, laser cut steel carousels.
- Designed for low cost maintenance and external temperature verification.

Versatility

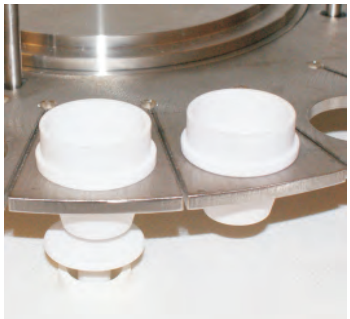
- Determination of multiple sample parameter with one analysis
- Automatic closing and opening of crucible covers during analysis
- Automatic switching of atmospheres (oxygen or nitrogen) during analysis.

Thermostep of ELTRA can determine multiple parameters such as moisture, voilatiles, ash, gypsum purity etc. on each sample during one analysis.
The Thermostep can analyse 19 samples with crucible covers simultanously with sample weights up to 5 grams.

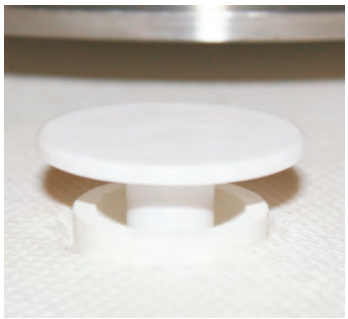
At the start of the cycle the crucibles are placed in the carousel and individually weighed to establish their tare weight.
Each crucible is then presented to the operator for sample loading. The starting sample weight is stored in the program and when all crucibles have been loaded the analysis begins.
The Thermostep can determine multiple thermogravimetric parameters such as moisture, volatiles and ash on each sample during one analysis. For example, during a run of coal samples the crucible covers are automatically raised at a user defined temperature and the atmosphere change from nitrogen to oxygen as required without any need for the operator to intervene **Start & Go**. This greatly reduces the analysis time and from a safety aspect there is no longer a requirement for the operator to handle hot crucible lids mid analysis.

In each phase of the program the following parameters can be programmed.

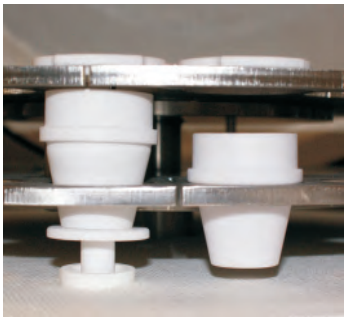
1. Phase temperature
2. Ramp rate to Phase temperature.
3. Phase time or constant weight (weight deviation).
4. Atmosphere. Inert or Oxidizing.



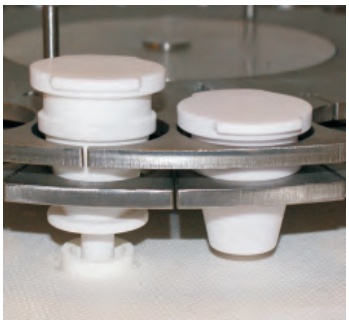
The crucible cover carousel is lifted off for easy access during sample weighing.



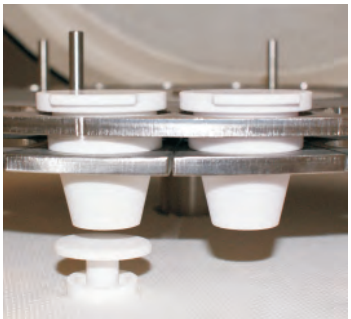
Integrated four decimal place balance and solid ceramic pedestal for high precision analysis.



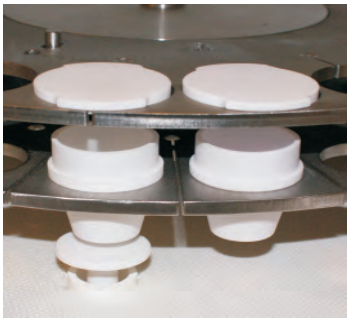
Lid carousel inserted after completion of sample weighing.



Crucible covers are automatically weighed prior to analysis.



Crucible covers can be open or closed automatically during analysis.



No need for operator intervention, avoiding the risk of injury when compared to the manual removal.

Innovative Furnace design

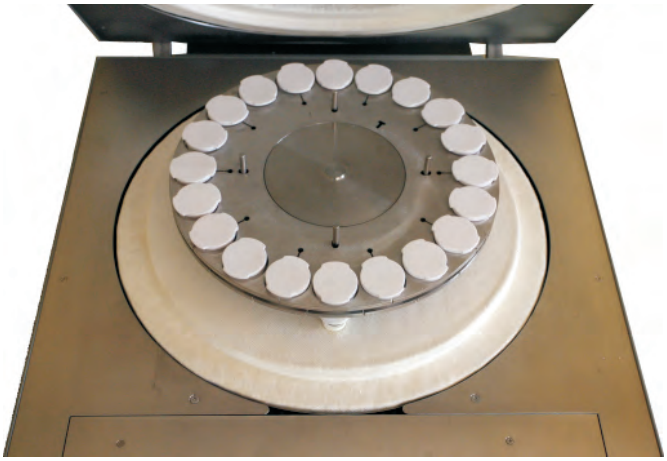
- Good access to sample carousel easy to load and weigh samples.
- Efficient cooling system - rapid cool down from 300°C.

The Thermostep unique furnace design allows easy access to the carousel for loading of the samples. The Thermostep furnace is lifted clear of the carousel when the lid is raised giving the operator very good access for loading, weighing and cleaning.
The bell-shaped upper heating element in the lid is sealed and has no holes for gases to escape. This helps to keep the atmosphere stable within the furnace and eliminates the "chimney effect".

The duration of thermogravimetric analysis depends from cooling time at the end of the analysis, when all sample parameters are taken already. During the cool down cycle the furnace lid is gradually opened step by step at factory set temperatures.

This greatly reduces the thermal shock to the heater and slowly introduces room temperature air. At 550°C the furnace lid is fully opened. At 300°C the internal cooling fan is raised.

The furnace has been designed to allow fan forced cooling air from the internal fan to circulate around the carousel, samples and furnace, rapidly bringing the temperature from 300°C to ambient. This innovation has greatly reduced the analysis time and increased the sample throughput.
During analysis, an external cooling fan extracts combustion gases and prevents the transfer heat to components located below the heating elements.



Easy acess to carousel for loading and cleaning.

At 300°C the internal cooling fan is raised for faster cooling down cycle.

Cool air from the internal fan circulates around the carousel, samples and furnace.

High Precision Temperature Control.

- Measurement of temperature directly above the weighing position.
- External temperatue check and calibration.
- Software temperature calibration

Accurate temperature control is the key to high precision. To provide the highest precision the Thermostep measures the internal furnace temperature within two thermocouples. One is located in the zone above the weighing pedestal, whereas the other is located inside the isolation material of the heating elements.
The furnace temperature calibration can be verified using a certified thermocouple and temperature meter. The certified thermocouple can be inserted into the spare thermowell located next to the instruments thermocouple. This will give a good comparison of the temperature within the furnace.

The **temperature calibration program** ensures that the temperature over its dynamic range is completely linear. By using a precision external temperature probe it is possible to measure temperatures at different levels over the dynamic range. These external measurements are programmed into the **temperature calibration program** and any offsets are automatically compensated for.

Built to last

- High quality components ensure accurate results and long lasting.
- Engineered for low maintenance with good accessibility.

The Eltra Thermostep TGA is built using high quality components. The four decimal place precision balance is made by a namable manufacturer and has a maximum weight range of 80 grams. Should the need arise to service or replace the balance it can be exchanged with an alternative model.

The sample carousel is rotated by a precision stepping motor. The motor and gearbox has 32000 steps per revolution which equates to 1600 steps between each sample position. The lifting up & down of the carousel is pneumatically controlled.

The ceramic fiber furnace heater is made up of two sections upper & lower. When the lid is closed the two heater sections fit together to form a seal ensuring good insulation and temperature stability.
The ceramic crucibles and the laser cut, high temperature alloy carousel will provide years of good service at an affordable price. Steel crucibles are also available as an option.

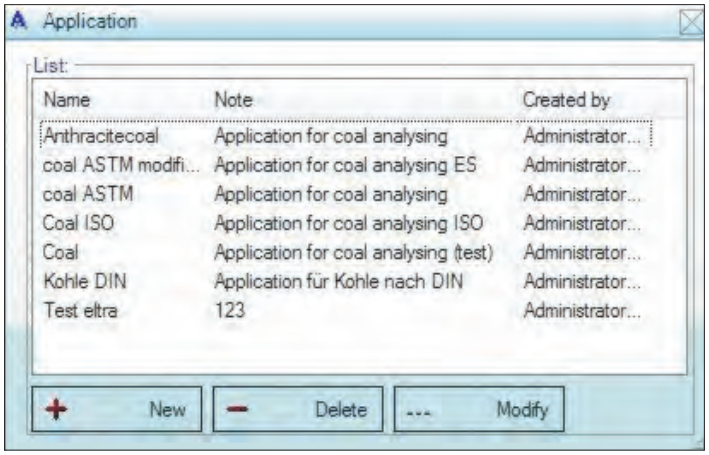
The Eltra Thermostep has been designed with ease of maintenance in mind. When the instrument requires service, several metal panels around the instrument can be easily removed to gain access to all the major internal components.

Sofware Innovations!

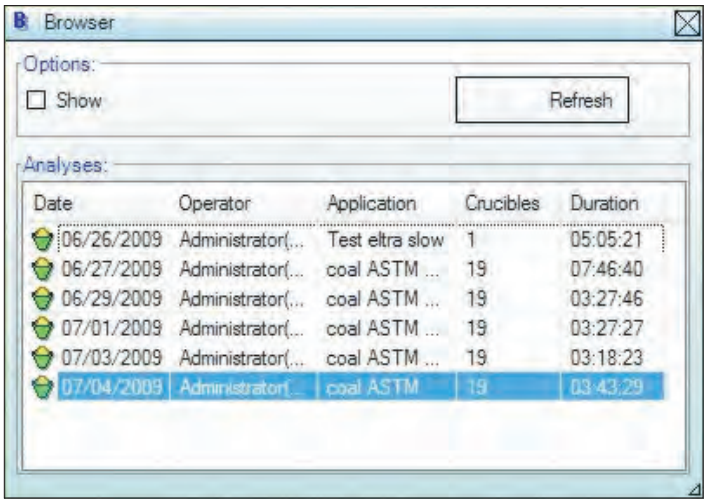
- Graphical, Windows® based software.
- Configurable for several individual operators.
- Flexible application development and data storage.
- Export and import of data to and from LIMS.
- Multiple TGA Analysers controlled by one PC.
- Diagnostic functions

The Eltra Thermostep TGA software runs on a Windows® based operating system and can be adapted for several individual operators. Password protected entry to the software for administrators and laboratory management secures the integrity of applications.

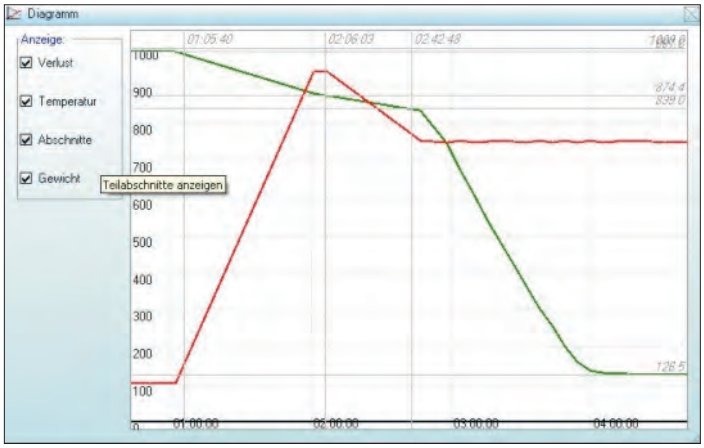
Applications can be developed and modified from existing applications. They can be renamed and tested without any change occurring to the original application.

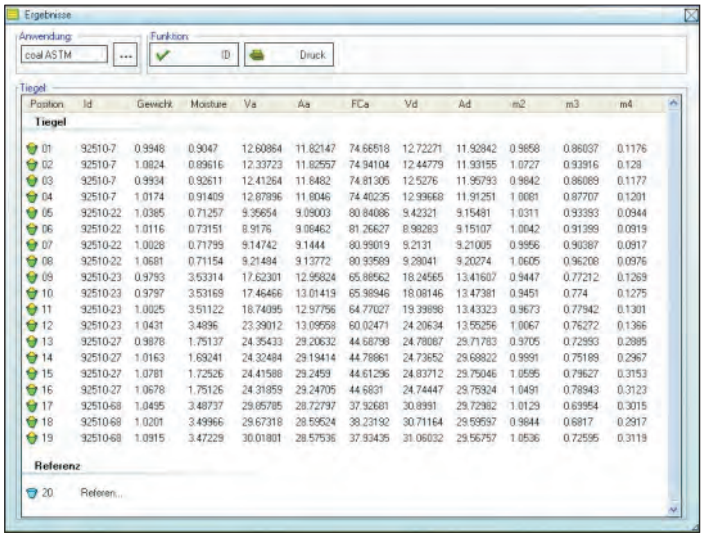


The hard drive offers virutally unlimited storage space for applications and data storage.



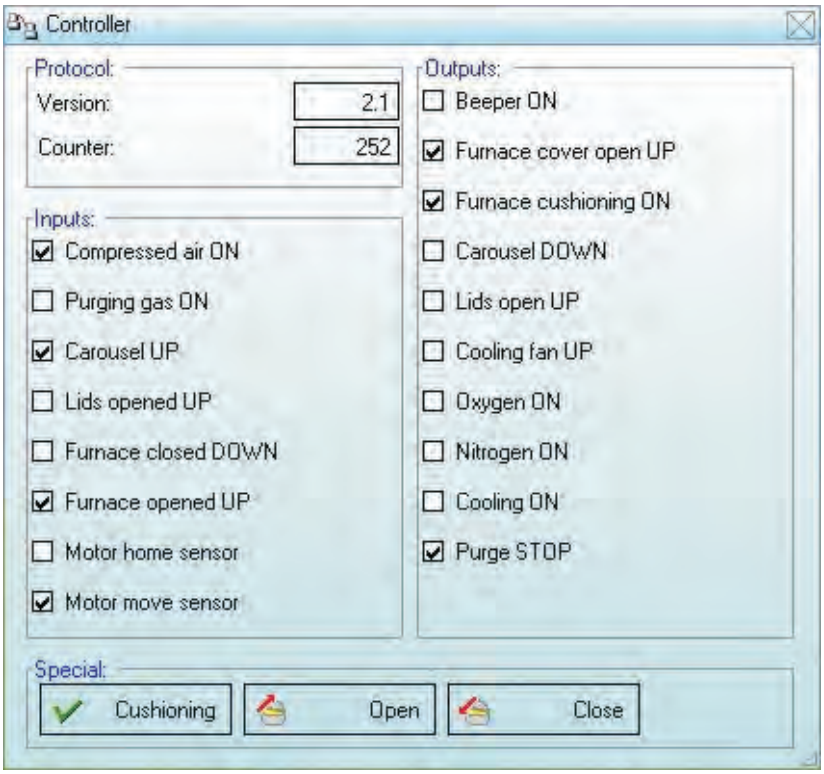
Each TGA result is stored as raw data and can be displayed graphically to show weight loss, temperature and time at each stage of the analysis cycle. The software offers an individual adaptable processing of the results at the basis of the raw data.





Individual sample data can be imported from LIMS (Laboratory Information Management System) into the software saving valuable time when loading samples into the TGA. The sample data and results can also be exported to LIMS to be combined with others results acquired from the same sample by other analysis methods.

The Eltra Thermostep TGA software incorporates an easy to use diagnostic section which monitors the input and output state of each function of the instrument.
Multiple Thermostep TGA insruments (at least 4) can be controlled by one PC simultanously - a saving in hardware and laboratory space.
Eltra continuously strive to improve their products, working closely with customers to provide practical assistance and software development where necessary.



Following instruments from ELTRA may be interesting for you:

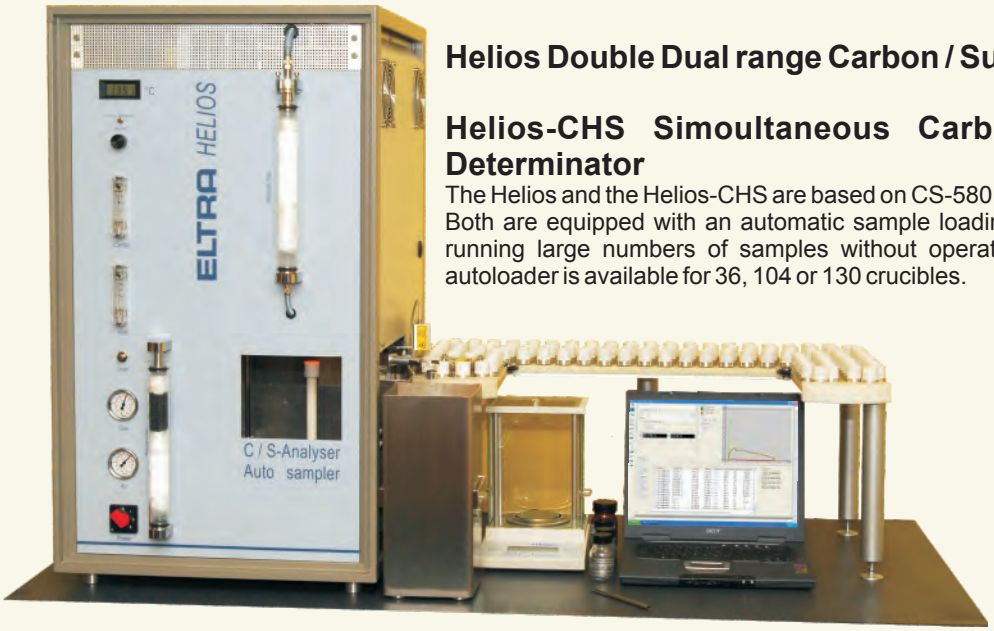
CS-580 Double Dual range Carbon / Sulfur Determinator

The CS-580 incorporates the latest in combustion technology. It is designed for the rapid simultaneous determination of carbon and sulfur in coal, coke, oil, ashes, catalysts, lime, gypsum, soils, rubber, leaves, soot, tobacco, waste, sand, glass etc. The CS-580 can be supplied with up to four independent infrared cells. The sensitivity of these cells can be customized to meet specific requirements. The IR-absorption lengths can be individually selected to offer optimum precision for the analysis of high and low levels of both, sulfur and carbon. The CS-580 features a micro controller, a high temperature resistance furnace up to 1550°C and solid state infrared detectors with auto zero and auto range control.

CHS-580 Simultaneous Carbon, Hydrogen and Sulfur Determinator

Based at the CS-580 this determinator is equipped with three independent infrared cells. It is designed for the rapid simultaneous determination of carbon and sulfur in coal, coke, ores, minerals, slags etc. The combustion gases coming from the furnace pass through the Hydrogen cell first and then through a moisture absorber. The dried water-free gases then pass through the CO_2 and SO_2 cells. As there is no moisture present in the CO_2 and SO_2 cells, there cannot be any influence from the hydrogen present on the carbon and sulfur results.

Determiators with Autoloader:



Helios Double Dual range Carbon / Sulfur Determinator

Helios-CHS Simoultaneous Carbon, Hydrogen and Sulfur Determinator

The Helios and the Helios-CHS are based on CS-580 resp. CHS-580.
Both are equipped with an automatic sample loading device, the autoloader, which enables running large numbers of samples without operator intervention. The robust and reliable autoloader is available for 36, 104 or 130 crucibles.

ThermoStep Specifications

METHODOLOGIES	PRECISION
Complies with AOAC, AACC, ASTM D5142, DIN EN ISO 9001, PN-G 04560	0.02% RSD (1σ, 1g sample)

MAXIMUM SAMPLE SIZE	NUMBER OF SAMPLES
5 grams (maximum)	19 (+1 reference)

NUMBER OF LIDS	BALANCE RESOLUTION	FURNACE TEMPERATURE
20	0.0001g	Ambient (to 1000°C)

TEMPERATURE CONTROL

Minimum	40°C	Accuracy	2% of set point or ±2°C (whichever is greater)
Maximum	1000°C	Stability	2% of set point or ±2°C (whichever is greater)

GAS FLOW RATE	GAS PRESSURE
1 to 10 l/min adjustable	Air 5 to 6 bar (75 to 90 psi) Nitrogen 2 to 4 bar (30 to 60 psi) internally regulated Oxygen 2 to 4 bar (30 to 60 psi) internally regulated

MINIMUM GAS PURITY	OPERATING TEMPERATURE	Humidity
Air 99.5%; dry, oil-free Nitrogen 99.9% Oxygen 99.9%	10°C to 30°C	20% to 80% non-condensing

VENTILATION

NOTE: The ThermoStep must be vented to an external exhaust

Exhaust Diameter 100mm

External Blower 4 m^3/min.

ELECTRICAL POWER REQUIREMENTS

ThermoStep	230V~	(± 10%), single phase, 50/60 Hz, 16 A
External Blower	230V~	(± 10%), single phase, 50/60 Hz, 0.25 A
Printer	230V~	50/60 Hz

COMPUTER REQUIREMENTS	SHIPPING TEMPERATURE
Desktop with TFT Laptop on request	-10°C to 65°C

DIMENSIONS				WEIGHT
ThermoStep	Height: 52 cm	Width: 55 cm	Depth: 62 cm	65 kg

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03.03.2010