



Thermogravimetric Analyser

TGA et500

Elite Thermal's Thermogravimetric Analysers (TGAs) are high-performance proximate analysers that measure the weight change of a sample as a function of temperature. They are used to study the thermal stability and composition of materials. Elite Thermal's TGAs are utilised for the determination of moisture, ash, volatile matter, fixed carbon, and loss on ignition (LOI) in a wide range of organic, inorganic, and synthetic materials.

Elite Thermal offers a comprehensive range of TGA systems designed to meet diverse analytical requirements. The TGA et500 is a versatile and reliable instrument featuring a programmable high-temperature furnace and an integrated precision balance, enabling fast, accurate, and repeatable measurements.

Configured with a dual-carousel design, the TGA et500 maximizes laboratory efficiency and throughput and is available in 20 or 24 position formats to suit different sample types and workloads.

Configuration Options:

20-Position Carousel: Provides a balanced solution for laboratories handling mixed sample matrices, offering flexibility across a wide range of applications.

24-Position Carousel: Ideal for high-throughput analysis of dense and homogeneous materials such as minerals, cement, graphite, and inorganic powders.

Elite Thermal offers a range of TGAs to meet the needs of different applications. TGA et500 is a versatile instrument that features a programmable furnace and an integrated balance, enabling fast and accurate measurements. The TGA et500 features a dual-carousel design that enables automatic placement and removal of crucible lids.

Elite Thermal's Thermogravimetric analysers replace traditional analytical techniques that are labour-intensive, slow, and susceptible to operational errors. TGA et500 comes with an integrated balance that combines drying, ashing, and weighing processes, thereby improving efficiency, precision, and providing high sample throughput.

Elite Thermal's TGA systems comply with several international standards, including ASTM, ISO, DIN, EN, and more. Elite Thermal's TGAs find applications in various industries, including coal, coke, mineral ores, cement, limestone, foodstuffs, feeds, and many more.

A typical coal analysis method consists of determining moisture, volatile matter, and ash content. Customisation options within the software encompass temperature ramping, start and end temperatures, gas flow programming, crucible lid handling, and mass constancy criteria, guaranteeing a fully adaptable instrument that meets the unique demands of every user.

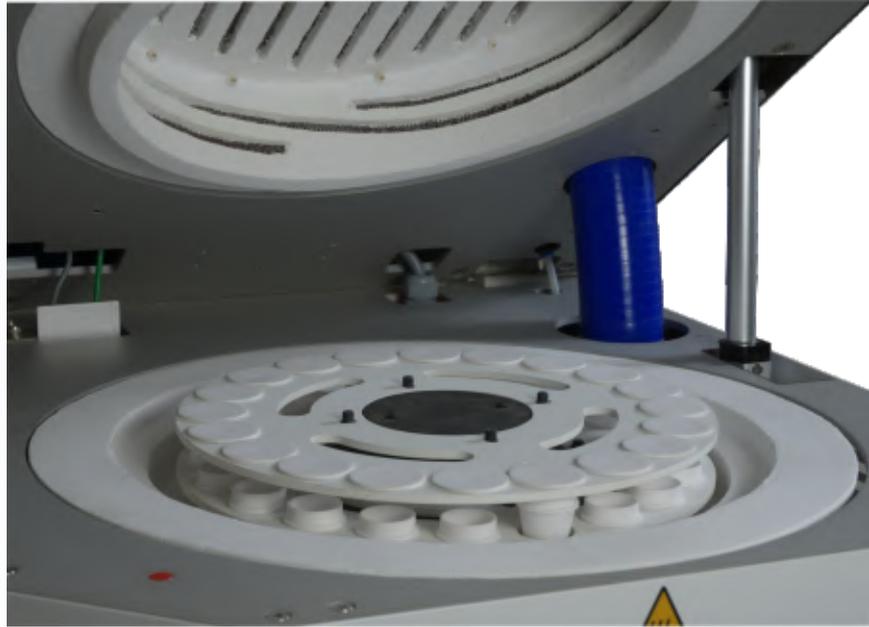
TGA et500 key features

- | Dual Carousel design
- | Simultaneous multi-sample analysis
- | Flexible carousel options for diverse sample matrices
- | Integrated high-resolution balance
- | Programmable furnace up to 1100 °C
- | Compliance with ASTM, ISO, DIN, EN, AOAC standards
- | Automatic placement & removal of crucible lids



Robust Heating Elements

- | High power thermal elements facilitate quick temperature ramp-up and provide exceptional temperature stability
- | Embedded heating elements ensure uniform temperature inside the furnace chamber throughout the analysis cycle
- | Higher maximum temperature range up to 1100°C

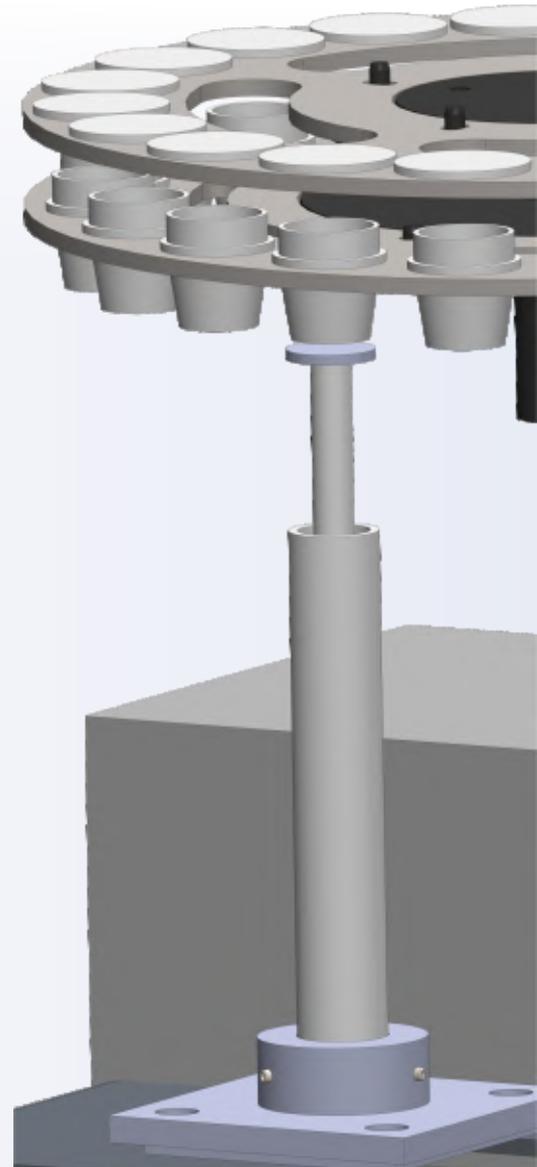


Effective Temperature Control

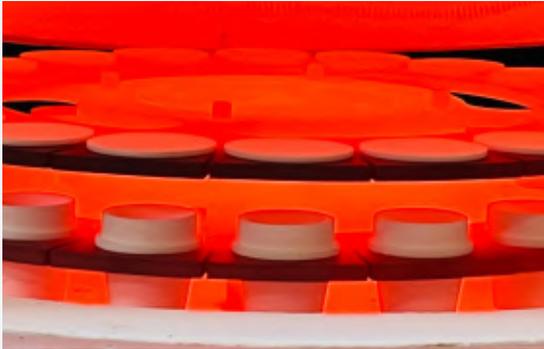
- | Best-in-class temperature setpoint control is achieved through the use of four thermocouples
- | The first thermocouple is used to detect the upper furnace temperature, while the second is used for lower furnace temperature detection. The third thermocouple is employed for real-time temperature measurement of the sample, and finally, the fourth thermocouple provides temperature cross-verification and temperature calibration functionality

Precise Weighing System

- | TGA et500 is integrated with a top-loading balance featuring an inbuilt auto-calibration facility and the ability to weigh the sample crucibles repeatedly throughout the analysis
- | Thermally isolated balance for accurate weighing
- | High-resolution balance ensuring accuracy to 0.0001 g for precise results



Exceptional Analytical Performance



- | State-of-the-art thermogravimetric analyser featuring robust hardware and user-friendly software encased in a durable design, delivering exceptional analytical capabilities
- | TGA et500 is constructed using high-quality materials, ensuring superior functionality and performance even in challenging conditions, and offering consistent operation and reliability
- | The carousels are constructed from specialised materials that withstand high temperature stress without warping
- | TGA et500 is available in a dual furnace package which allows for two TGAs to be operated from a single PC for laboratories that require the highest sample throughput

Superior Carousel Mechanism



- | Dual carousel with automatic placement and removal of crucible lids
- | Carousel MOC: Either Metal or Ceramic
- | Bi-directional movement and ability to skip empty positions for faster analysis times
- | Up-and-down movement of the carousel using pneumatic control and motorised rotation enables precise and accurate analysis without any oscillation

Exhaust & Cooling System

- | In-built exhaust system with two internal blowers minimises harmful vapours and odours in the laboratory
- | Cooldown process is automatically initiated at the end of each analysis cycle
- | User programmable furnace lid opening to improve cool down time
- | External exhaust system is optionally available for even faster cooling

External exhaust system



Gas Flows

- | With TGA et500, users can seamlessly transition between oxidising and inert atmospheres through automated controls
- | An optional feature includes a software-controlled mass flow controller, which enables programmable adjustment of gas flow rates

TPH Module (Temperature, Pressure & Humidity)

An optional feature includes a software-monitored TPH Module. The TPH Module enhances analytical reliability by supporting:

- | Balance stability and drift control under varying environmental conditions
- | Buoyancy and air density compensation, improving the accuracy of apparent sample weight and minimizing buoyancy effects acting on the crucible

Carousel Architecture & Automation

Dual Carousel Design

- | Bi-directional rotation
- | Automatic skipping of empty positions
- | Pneumatic vertical movement for precise positioning
- | Smooth, vibration-free operation

Carousel Materials

- | The carousel is available in metal or ceramic material grades. Carousel MOC must specify while placing the order



20-Position Carousel – Optimised for General Purpose Applications

The 20-position carousel is a versatile configuration for routine analysis, offering an optimal balance between sample throughput and crucible capacity. It ensures consistent geometry, controlled surface area, and uniform thermal exposure in compliance with ASTM, ISO, DIN, and EN fuel testing standards.



TGA et500 With 20 Positions

Key Advantages

- | Dual carousel with automatic placement and removal of crucible lids
- | Balanced sample capacity for routine laboratory workflows
- | Uniform crucible geometry for reproducible heating conditions
- | Efficient gas–sample interaction under inert and oxidising atmospheres
- | High repeatability and reproducibility across multiple fuel samples
- | Suitable for continuous quality control and compliance testing

Typical Applications

- | Coal and coke
- | Biomass and alternative fuels
- | Solid recovered fuels (SRF/RDF)
- | Petroleum coke and carbonaceous fuels
- | Mixed fuel matrices in power and process industries

24-Position Carousel - Optimised for Dense and Homogeneous Samples

The 24-position carousel utilises small-volume crucibles to provide maximum throughput with excellent repeatability.

Key Advantages

- | High sample throughput
- | Uniform crucible geometry and surface exposure
- | Ideal for routine, repetitive testing
- | Reduced analysis cycle cost per sample

Typical Applications

- | Minerals and ores
- | Cement, clinker, raw meal
- | Inorganic chemicals
- | Graphite and carbon materials
- | Fine powders and homogeneous solids



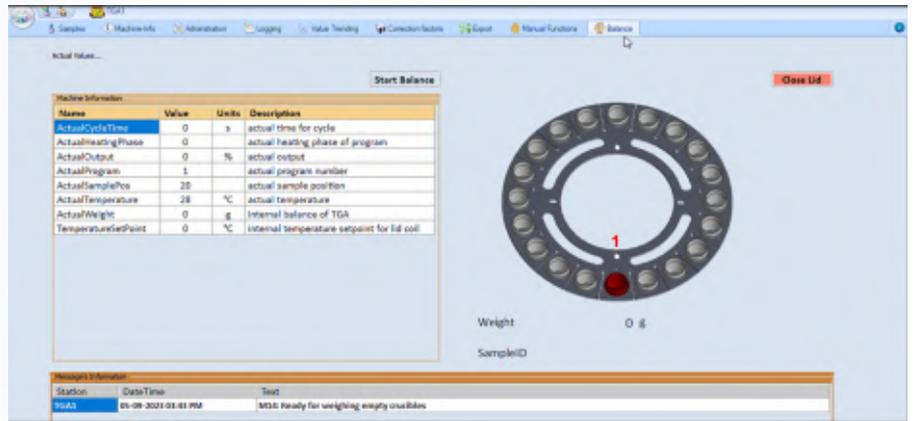
TGA et500 With 24 Positions

Crucibles with various volumes



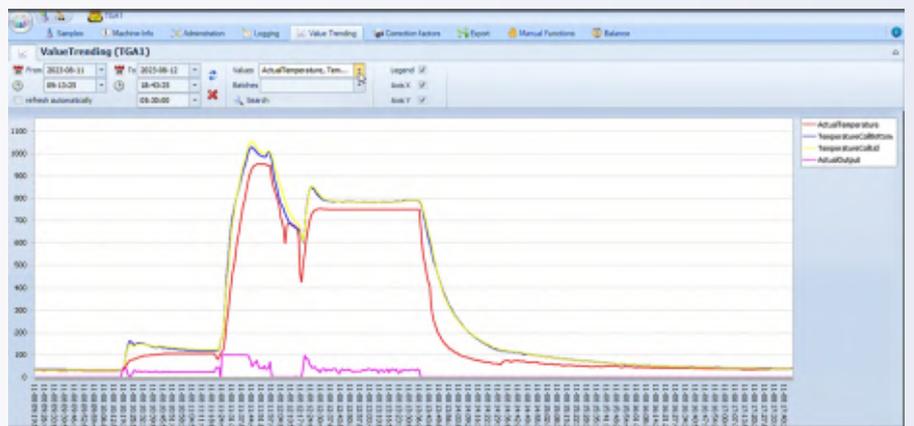
Software Features

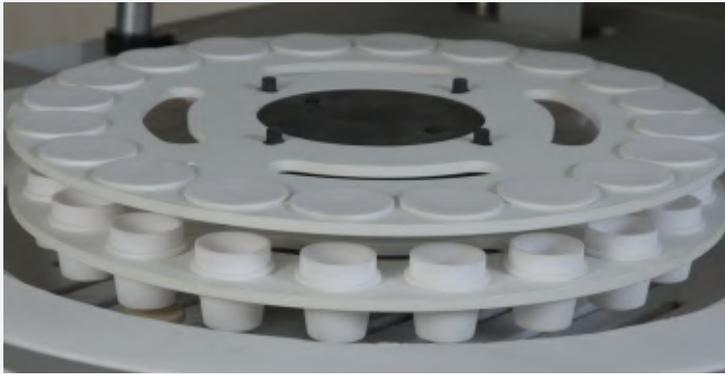
- The user-friendly software enables complete control of the analyser through a graphical interface. It provides visual representations of temperature versus weight loss measurements, as well as real-time displays of parameters such as furnace temperature, sample status, and remaining time
- The software provides flexible method settings, including temperature ramps, set points, programmable gas flows, and options for placing or removing crucible lids, as well as criteria for maintaining mass constancy. These settings cater to various customer applications such as moisture determination, volatile matter determination, Loss on Ignition (LOI) determination, and ash determination
- TGA et500 comes pre-programmed with 10 in-built standard methods for analysing coal samples in accordance with ASTM and ISO standards. Additionally, the software enables users to configure up to 16 custom methods based on their specific requirements
- The software offers a versatile sample login and loading procedure, accompanied by real-time graphical representations of analysis data



Turntable position: 5					Sample: 5			
Moisture	Volatile	Volatile Dry	Ash	Ash Dry	Empty Crucible	Lid	Sample IN	
2.513	20.668	21.201	34.826	35.723	19.1090 g	21.2468 g	1.0030 g	
Fixed Carbon	Fixed Carbon Dry	LOI200	LOI450	LOI850	LOI750	LOI950		
41.994	43.076							

Heating phase:						
No	Temperature	Duration	Lid	Weight OUT (raw)	CF	Sample OUT (corrected)
1	105	3600	0	20.0879 g	-0.0011 g	0.9778 g
2	950	180	1	41.1402 g	-0.0139 g	0.7705 g
3	600	60	1	41.1052 g	-0.0063 g	0.7431 g
4	750	3600	0	19.4634 g	-0.0051 g	0.3493 g

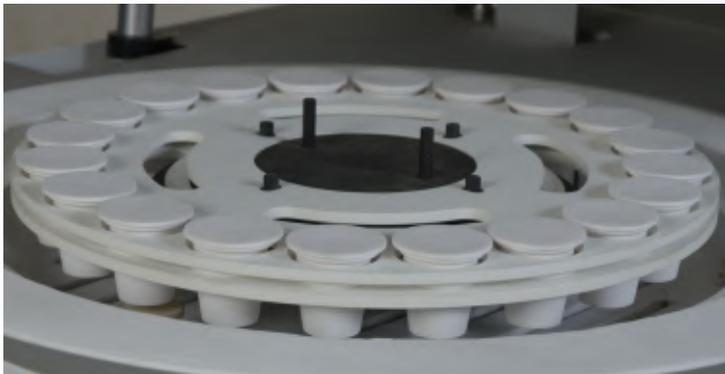




Crucible lids open



Weighing with crucible lids open



Crucible lids closed



Weighing with crucible lids closed

| TGA et500 employs two carousels, each built with high strength and corrosion-resistant materials. One carousel is designated for crucibles, while the other is designated for crucible lids

| The carousels are constructed using a unique material that exhibits exceptional resistance to warping when exposed to elevated levels of thermal stress

| The second carousel enables the automated placement and removal of crucible lids within the furnace, eliminating the need to open the furnace lid

| The dual carousel design offers enhanced precision in the measurement of volatile matter along with automated functionality, thereby preventing any potential sample oxidation

| Automatic crucible management removes the risk of potential burns to the operator when exposed to elevated temperatures, as well as removes the possibility of the operator inadvertently dropping the crucible lids into the furnace



Specifications	TGA et500
Temperature Range	Programmable from ambient to 1100°C
Temperature Control Precision	±2°C (or) ±2% of set point temperature
Temperature Stability	±2°C (or) ±2% of set point temperature
Ramp Rate	Programmable from 10°C /minute to 50°C /minute
Balance	Integrated Balance
Balance Resolution	0.0001g (0.1mg)
Balance Readability	0.0001g (0.1mg)
Weight Loss	0 to 100%
Sample Size	up to 10 grams based on the sample type and its characteristics
Number of Samples	19 sample + 1 reference (by using 20-position carousel) 23 samples + 1 reference (by using 24-position carousel)
Number of Carousels	Two (one for crucibles and the other for crucible lids)
Carousel Material	Metal or Ceramic
Weighing Precision	0.02% RSD (on inert samples)
Electrical Power Requirements	230V (± 10%) / single phase / 50/60Hz / 32A
Computer	230V (± 10%) / single phase / 50/60Hz / 2A

For more details, please check TGA et500 technical data sheet.

Ordering Information

Item Name	Part Number
TGA et500 Thermogravimetric Analyser, Dual Carousel, Metal, 20 Position	TGA et500-100-20
TGA et500 Thermogravimetric Analyser, Dual Carousel, Ceramic, 20 Position	TGA et500-200-20
TGA et500 Thermogravimetric Analyser, Dual Carousel, Metal, 24 Position	TGA et500-100-24
TGA et500 Thermogravimetric Analyser, Dual Carousel, Ceramic, 24 Position	TGA et500-200-24
TGA et500D Dual Furnace Package, Thermogravimetric Analyser, Metal, 20 Position	TGA et500D-100-20
TGA et500D Dual Furnace Package, Thermogravimetric Analyser, Ceramic, 20 Position	TGA et500D-200-20
TGA et500D Dual Furnace Package, Thermogravimetric Analyser, Metal, 24 Position	TGA et500D-100-24
TGA et500D Dual Furnace Package, Thermogravimetric Analyser, Ceramic, 24 Position	TGA et500D-200-24
Ceramic Crucible 11cc for 20 pos. carousel, pack of one	et100-146
Ceramic Crucible lid for 11cc Crucible(et100-146), pack of one	et100-046
Ceramic Crucible 14cc for 20 pos. carousel, pack of one	et100-147
Ceramic Crucible lid for 14cc Crucible (et100-147), pack of one	et100-047
Ceramic Crucible 42cc for 20 pos. carousel, pack of one	et100-148
Ceramic Crucible 8cc for 24 pos. carousel, pack of one	et100-142
Ceramic carousel for crucible – 20 Positions	et107-321SH
Ceramic carousel for crucible lids, 20 positions	et107-321
Metal Carousel for Crucibles – 20 Positions	et112-255
Metal carousel for crucible lids, 20 positions	et112-254
Ceramic Plate Alti for Crucibles – 20 Positions	et111-426
Metal Carousel, for crucible – 24 positions	et112-265
Metal Carousel, for crucible lid – 24 positions	et112-264
Ceramic Carousel, for crucible – 24 positions	et112-272
Ceramic Carousel, for crucible lid – 24 positions	et112-270
External Blower, TGA - 1Number	et101-244

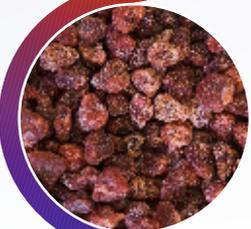
For more details on TGA spares, please check our price list.

Elite Thermal TGA et500 complies with the following test methods.

Coal & Coke



Mineral Ores



Gypsum & Hydrated lime



Soil & Fertiliser



Cement & Building Materials



Food & Feed



Standard	Title of the standard
ASTM D7582-15	Standard Test Methods for Proximate Analysis of Coal and Coke by Macro Thermo Gravimetric Analysis.
ASTM D5142	Standard Test Methods for Proximate Analysis of the Analysis Sample of Coal and Coke by Instrumental Procedures.
ISO 562	Hard Coal and Coke - Determination of volatile matter.
ASTM D7348	Standard Test Methods for Loss on Ignition (LOI) of Solid Combustion Residues.
DIN 51718	Testing of solid fuels - Determination of the water content and the moisture of analysis sample.
ASTM E1755	Standard Test Method for Ash in Biomass.
DIN 51719	Determination of ash in solid mineral fuels.
ISO11722	Solid mineral fuels - Hard coal - Determination of moisture in the general analysis test sample by drying in nitrogen.
ISO1171	Solid mineral fuels - Determination of Ash.
EN 15148	Solid biofuels - Determination of the content of volatile matter.
ISO/TR 18230	Determination of Loss on Ignition - Non oxidized ores.
ASTM C114	Determination of Loss on Ignition of Hydraulic Cement.
ISO 806	Aluminum Oxide Primarily used for the product of aluminium - Determination of loss of mass at 300°C and 1000°C.
EN 14775	Solid biofuels - Determination of Ash content.
AS1038	Proximate analysis & Testing.
BS1016	Proximate analysis.

High Temperature Furnaces

Elite Thermal offers a wide range of standard and custom-designed chamber and tube furnaces that are widely used in educational, research and industrial organizations throughout the world. This design and engineering capability enable Elite Thermal and its representatives to service contracts ranging from laboratory scale through full-scale batch and continuous production equipment.

Chamber Furnaces

- Elite Thermal offers a wide selection of chamber sizes in front loading, top loading, bottom loading, vacuum condition and numerous customisation's for its chamber furnaces
- These products are intended for usage in the temperature range of 750°C to 1800°C



Tube Furnaces

- The tube furnaces from Elite Thermal are intended for use at up to 1850°C
- They come in a variety of tube diameters/lengths, single and multi-heated zones, split (horizontal or vertical), rotating, vacuum options and many other configurations



Accessories

Elite Thermal offers a wide range of high-end accessories and consumables for safe and efficient process.



Thermocouples



Ceramic liners



Crucibles, Boats, Ignition Dishes & Plates



Personnel safety accessories



Ceramic work tubes



Gas tight end seals Metal Atmosphere Retorts



Temperature Controllers



Innovative solutions for your Applications

- | Aerospace
- | Automotive
- | Cement Industry
- | Ceramics
- | Coal Industry
- | Education
- | Electronics
- | Finishing Industry
- | Glass
- | Materials Testing
- | Metals Industry
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- | Research
- | Superconductivity

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