Thermogravimetric Analyser

TGA et250

Ver 01.26

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Thermogravimetric Analysers

Elite Thermal's Thermogravimetric Analysers (TGAs) are high-performance proximate analysers that determine mass change as a function of temperature and time. They are used to evaluate the thermal stability and composition of materials and are widely applied for the determination of moisture, ash, volatile matter, fixed carbon, and loss on ignition (LOI) in a broad range of organic, inorganic, and synthetic materials.

Elite Thermal offers a comprehensive range of TGA systems designed to meet diverse analytical requirements. The TGA et250 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 single-carousel design, the TGA et250 maximizes laboratory efficiency and throughput and is available in 12, 20, or 24 position formats to suit different sample types and workloads.

Configuration Options:

- **12-Position Carousel:** Optimised for large-volume, low-density samples such as food, feed, cereals, flours, and agricultural products where increased exposed surface area is required for accurate analysis.
- **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's Thermogravimetric analysers replace traditional analytical techniques that are labour-intensive, slow, and susceptible to operational errors. TGA et250 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 are designed to comply with major international standards, including ASTM, ISO, DIN, EN, and related methodologies. Typical applications span a wide range of industries, including coal and coke, mineral ores, cement and limestone, foodstuffs, animal feeds, biomass, and specialty materials.

A typical proximate analysis workflow includes the determination of moisture, volatile matter, and ash content, with fixed carbon calculated by difference. The advanced software provides extensive customisation options, including temperature ramp rates, start and end temperatures, programmable gas flows, and mass-constancy criteria, ensuring a highly adaptable platform that meets the specific analytical needs of each laboratory.

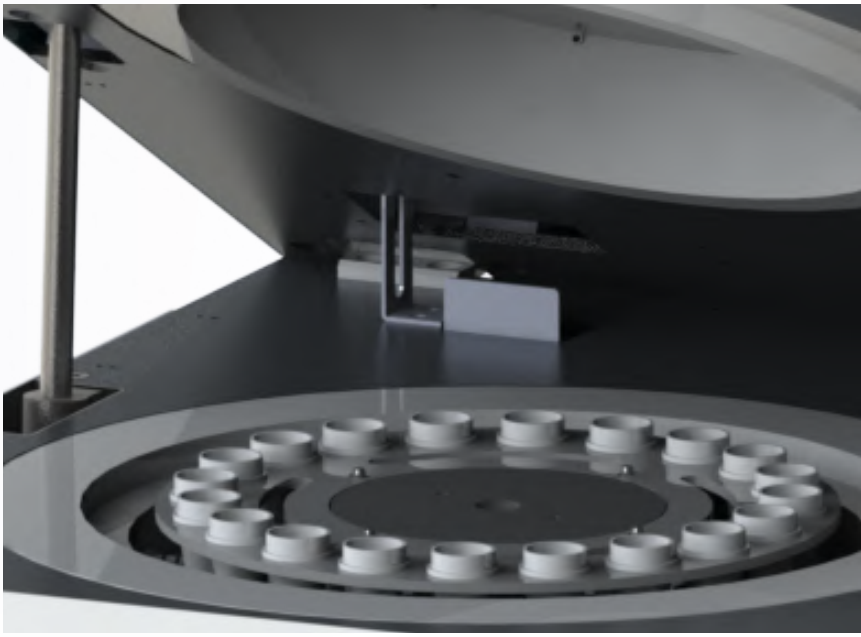
TGA et250 key features

- Single 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
- Manual Handling of Crucible lids

Instrument Highlights and Features

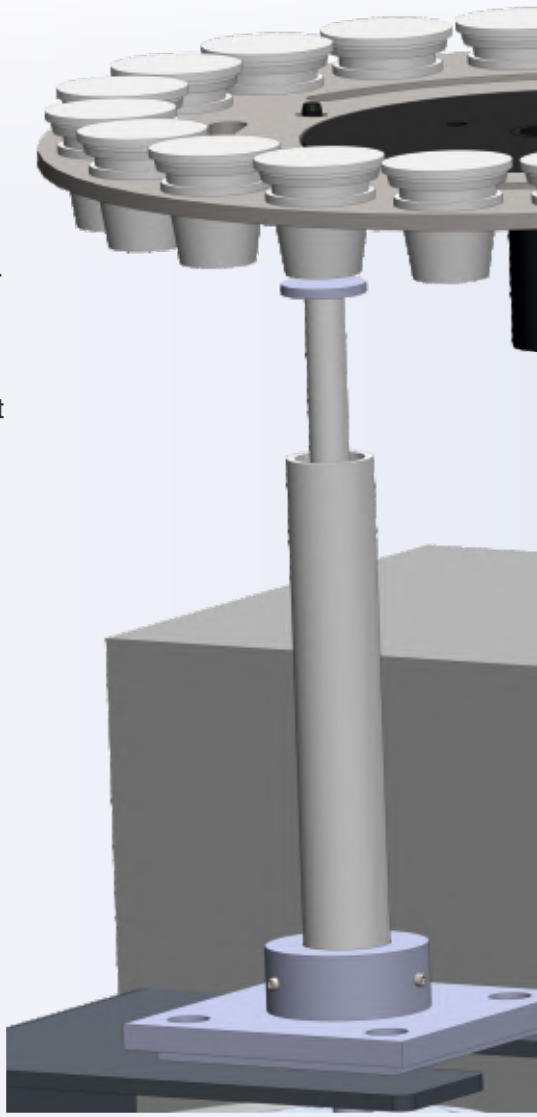
Robust Heating Elements

- 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

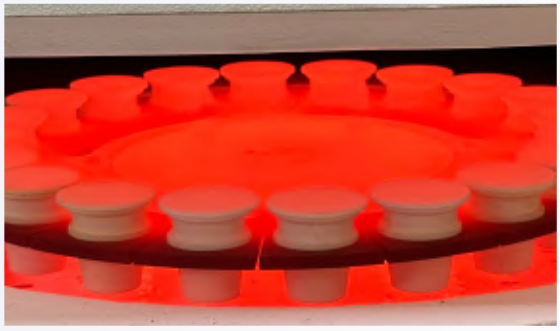
- Best-in-class temperature set point control is achieved through the use of two high precision thermocouples
- The first thermocouple is used to monitor the furnace temperature. The second thermocouple is used to precisely measure the sample temperature
- Additional thermocouples are available as an optional feature. In addition to the two thermocouples mentioned above, a third thermocouple is provided for monitoring the lower furnace, and a fourth thermocouple provides temperature cross-verification and temperature calibration functionality
- These third and fourth thermocouples are factory-installed options. They must be ordered along with the main TGA et250 instrument



Precise Weighing System

- TGA et250 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

Instrument Highlights and Features



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 et250 is constructed using high-quality materials, ensuring superior functionality and performance even in challenging conditions, and offering consistent operation and reliability
- The carousel is constructed from specialised materials that withstand high temperature stress without warping
- TGA et250 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

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
- Up-and-down movement of the carousel using pneumatic control and motorised rotation enables precise and accurate analysis without any oscillation
- External exhaust system is optionally available for even faster cooling

External exhaust system

Gas Flows

- With TGA et250, 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)

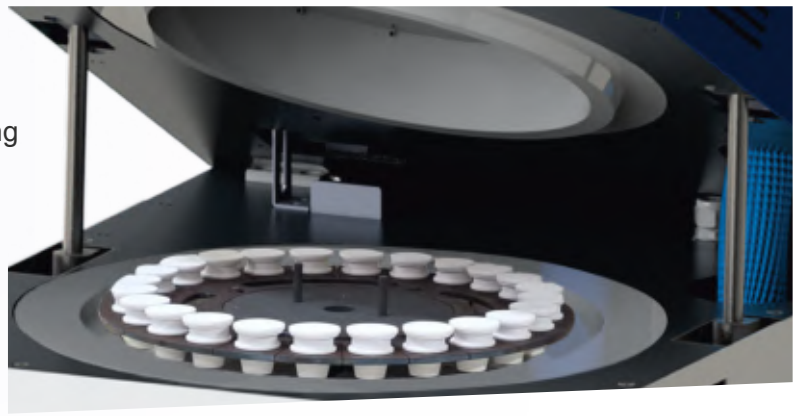
An optional feature includes a software-monitored TPH Module. The TPH Module enhances analytical reliability by supporting:

- 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

Single 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.

12-Position Carousel Optimised for Low-Density, High-Bulk Materials

The 12-position carousel is specifically engineered for large-volume crucibles, ideal for materials requiring greater exposed surface area as referenced in ISO 2171, ISO 712, AOAC, and ASTM methods.

Key Advantages

- Large exposed surface area for uniform heating
- Reduced risk of spattering, puffing, and sample loss
- Representative sampling without over-compaction

Typical Applications

- Semolina, flour, bran, starch
- Cereals (wheat, rice, maize, barley)
- Food and feed products
- Agricultural and biomass materials

This configuration is particularly suitable where standards specify minimum crucible surface area to ensure accurate moisture and ash determination.

TGA et250 With 12 Positions

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 et250 With 20 Positions

Key Advantages

- Balanced sample capacity for routine laboratory workflows
- Uniform crucible geometry for reproducible heating conditions
- High repeatability and reproducibility across multiple 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

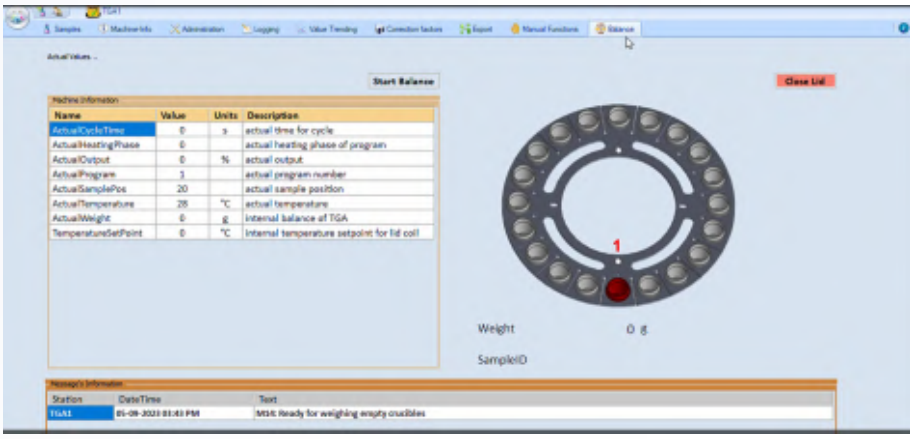
Typical Applications

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

TGA et250 With 24 Positions

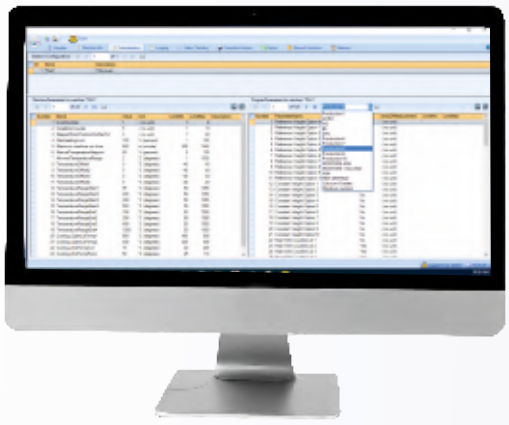
Software Features

- 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

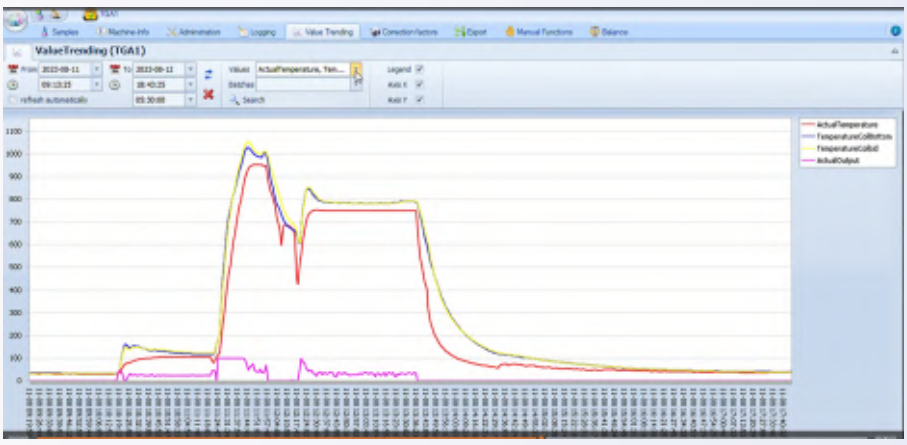


- The software provides flexible method settings, including temperature ramps, set points, programmable gas flows, and options for placing or removing crucible lids, as well as criteria for maintaining mass constancy. These settings cater to various customer applications such as moisture determination, volatile matter determination, Loss on Ignition (LOI) determination, and ash determination

- TGA et250 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



Specifications	TGA et250
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) 11 sample + 1 reference (by using 12-position carousel) 23 samples + 1 reference (by using 24-position carousel)
Number of Carousels	One for crucibles and 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 et250 technical data sheet.

Crucibles with various volumes

et100-142 et100-146 et100-147 et100-148 et100-149

Ordering Information

Item Name	Part Number
TGA et250 Thermogravimetric Analyser, Single Carousel, Metal, 12 Position	TGA et250-100-12
TGA et250 Thermogravimetric Analyser, Single Carousel, Ceramic, 12 Position	TGA et250-200-12
TGA et250 Thermogravimetric Analyser, Single Carousel, Metal, 20 Position	TGA et250-100-20
TGA et250 Thermogravimetric Analyser, Single Carousel, Ceramic, 20 Position	TGA et250-200-20
TGA et250 Thermogravimetric Analyser, Single Carousel, Metal, 24 Position	TGA et250-100-24
TGA et250 Thermogravimetric Analyser, Single Carousel, Ceramic, 24 Position	TGA et250-200-24
TGA et250D Dual Furnace Package, Thermogravimetric Analyser, Ceramic, 12 Position	TGA et250D-200-12
TGA et250D Dual Furnace Package, Thermogravimetric Analyser, Metal, 12 Position	TGA et250D-100-12
TGA et250D Dual Furnace Package, Thermogravimetric Analyser, Metal, 20 Position	TGA et250D-100-20
TGA et250D Dual Furnace Package, Thermogravimetric Analyser, Ceramic, 20 Position	TGA et250D-200-20
TGA et250D Dual Furnace Package, Thermogravimetric Analyser, Metal, 24 Position	TGA et250D-100-24
TGA et250D Dual Furnace Package, Thermogravimetric Analyser, Ceramic, 24 Position	TGA et250D-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 45cc for 12 pos. carousel, pack of one	et100-149
Ceramic Crucible 8cc for 24 pos. carousel, pack of one	et100-142
Ceramic Crucible lid for 8cc crucible(et100-142), pack of one	et100-042
Metal Carousel, for crucible – 24 positions	et112-265
Ceramic Carousel, for crucible – 24 positions	et112-272
Ceramic carousel for crucible – 20 Positions	et107-321SH
Metal Carousel for Crucibles – 20 Positions	et112-255
Metal Carousel for Crucible – 12 Positions	et112-267
Ceramic Carousel for Crucible – 12 Positions	et112-269
External Blower, TGA - 1Number	et101-244

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

Elite Thermal TGA et250 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.

Other Products From Elite Thermal

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

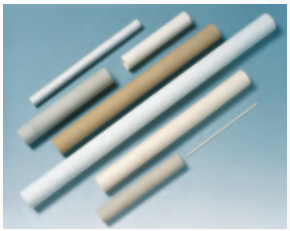
Elite Thermal offers a wide range of high-end accessories and consumables for safe and efficient process.

Thermocouples

Ceramic liners

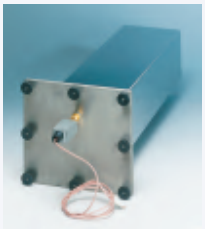
Crucibles, Boats, Ignition Dishes & Plates

Personnel safety accessories



Ceramic work tubes

Gas tight end seals



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