TA Instruments

The WORLD'S FINEST line of THERMOGRAVIMETRIC ANALYZERS

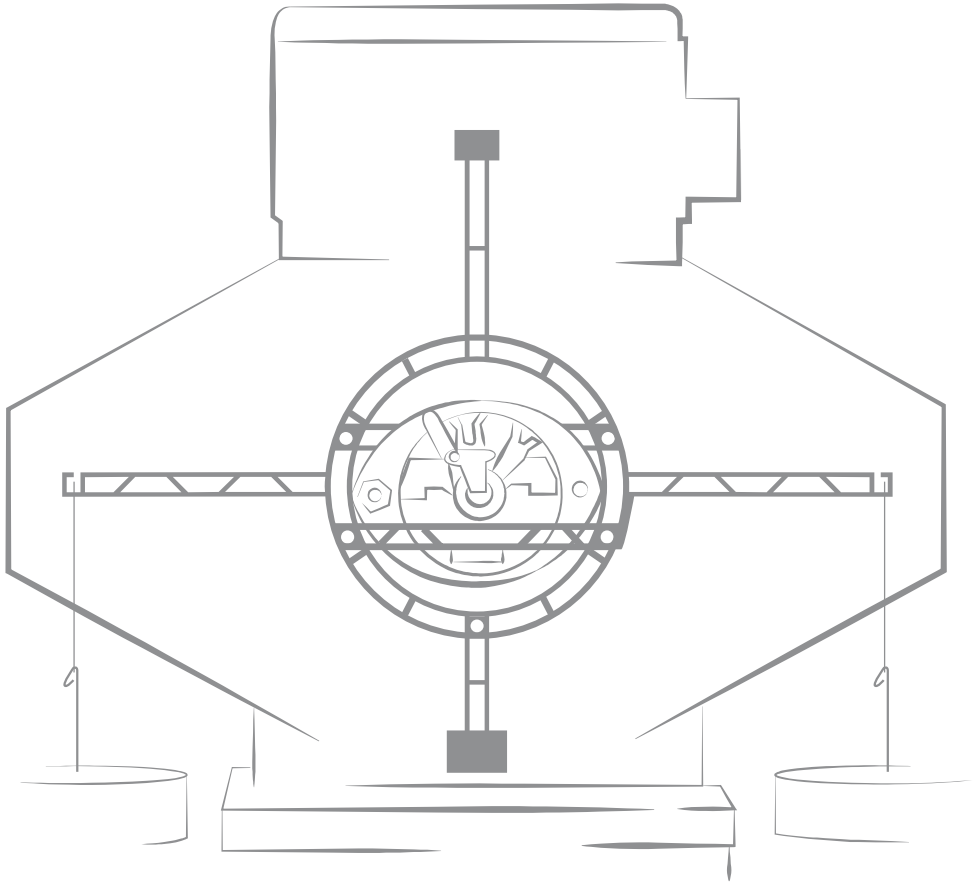
TGA SYSTEMS that **deliver** the

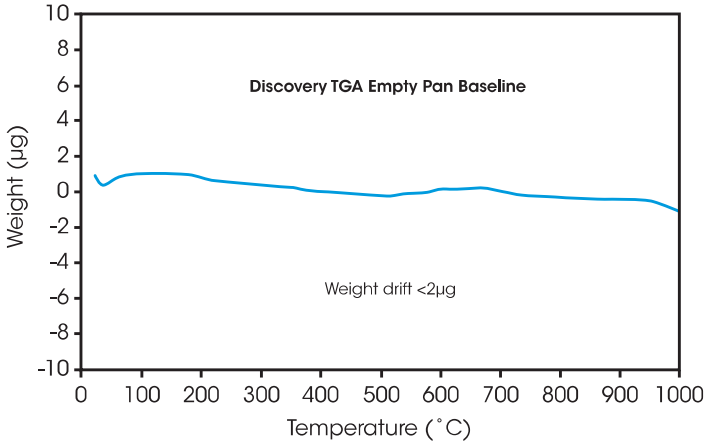
Most Accuracy

Highest Sensitivity

Greatest Reliability

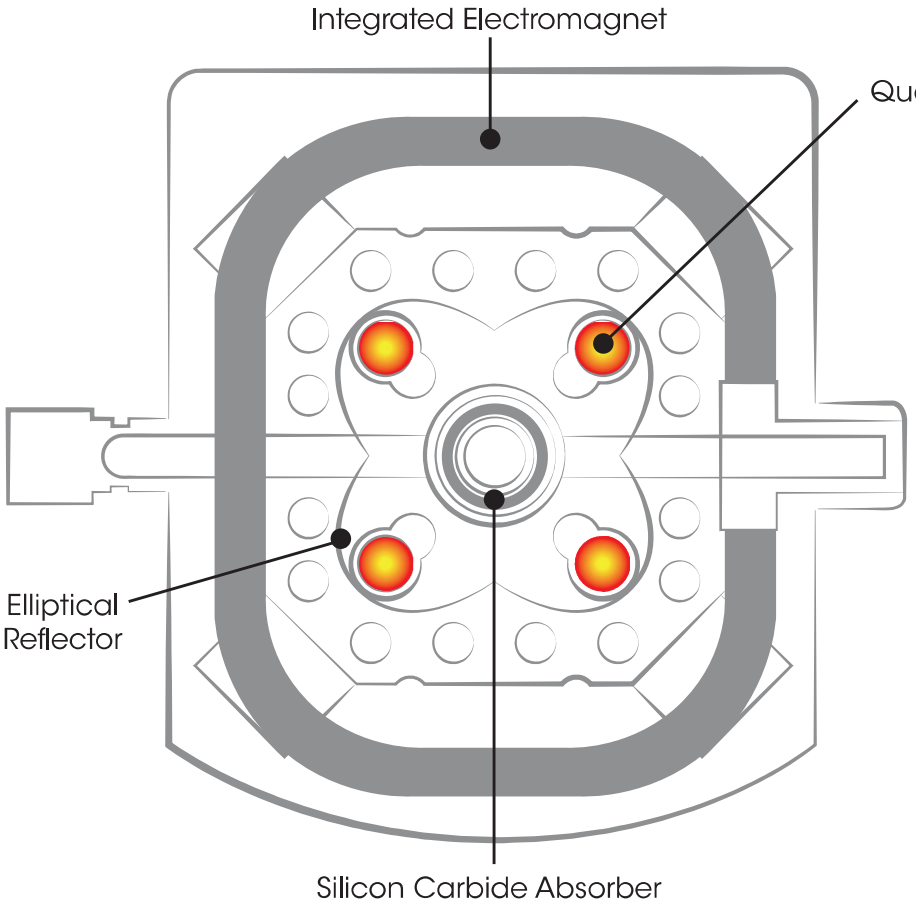
HIGH SENSITIVITY and STABLE WEIGHT MEASUREMENTS

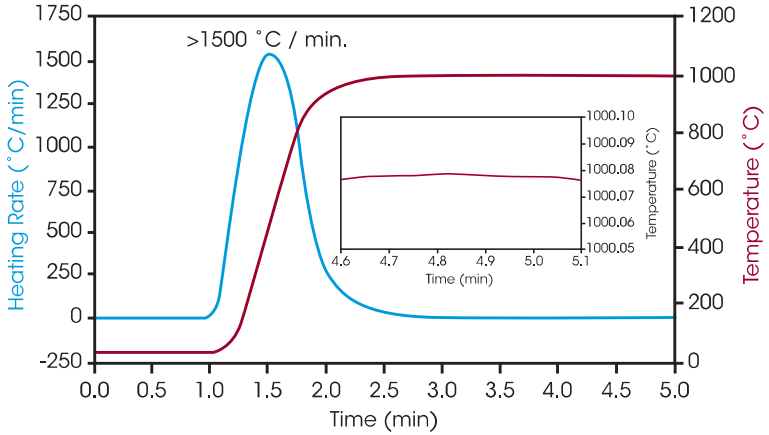




PLUS...

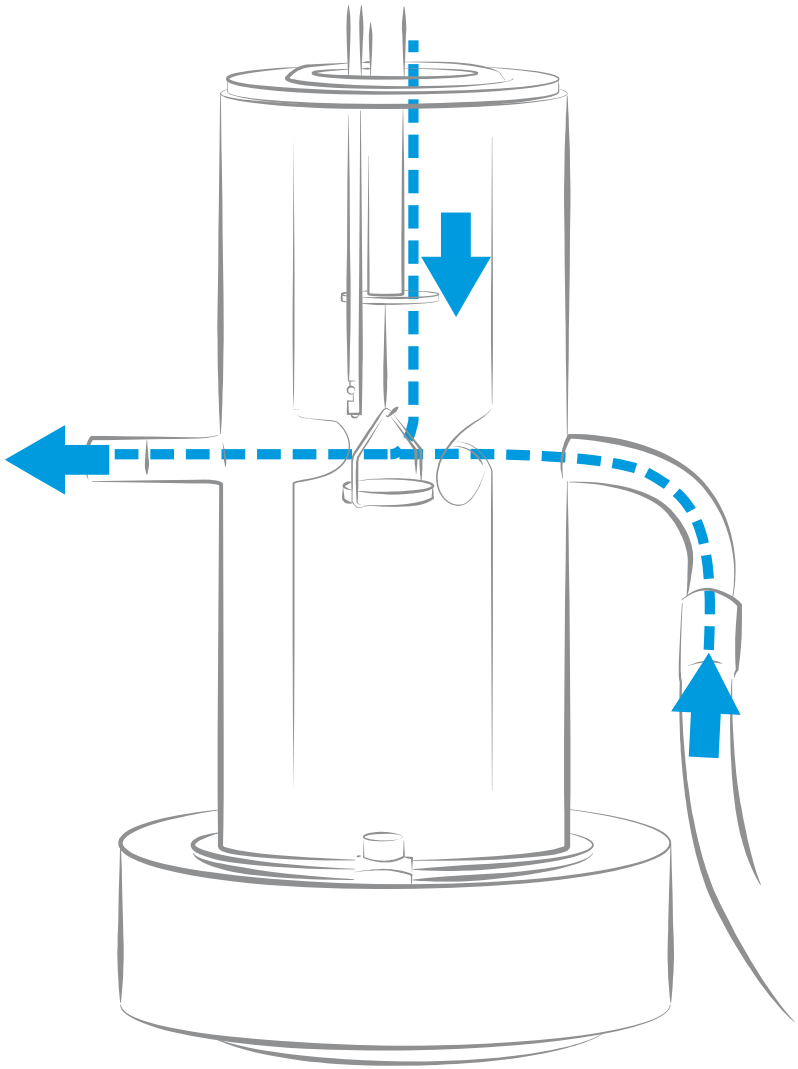
FASTEST and MOST ACCURATE TEMPERATURE CONTROL

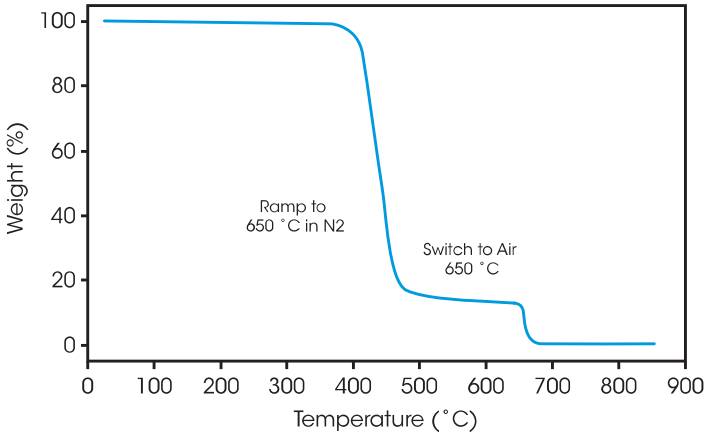




PLUS...

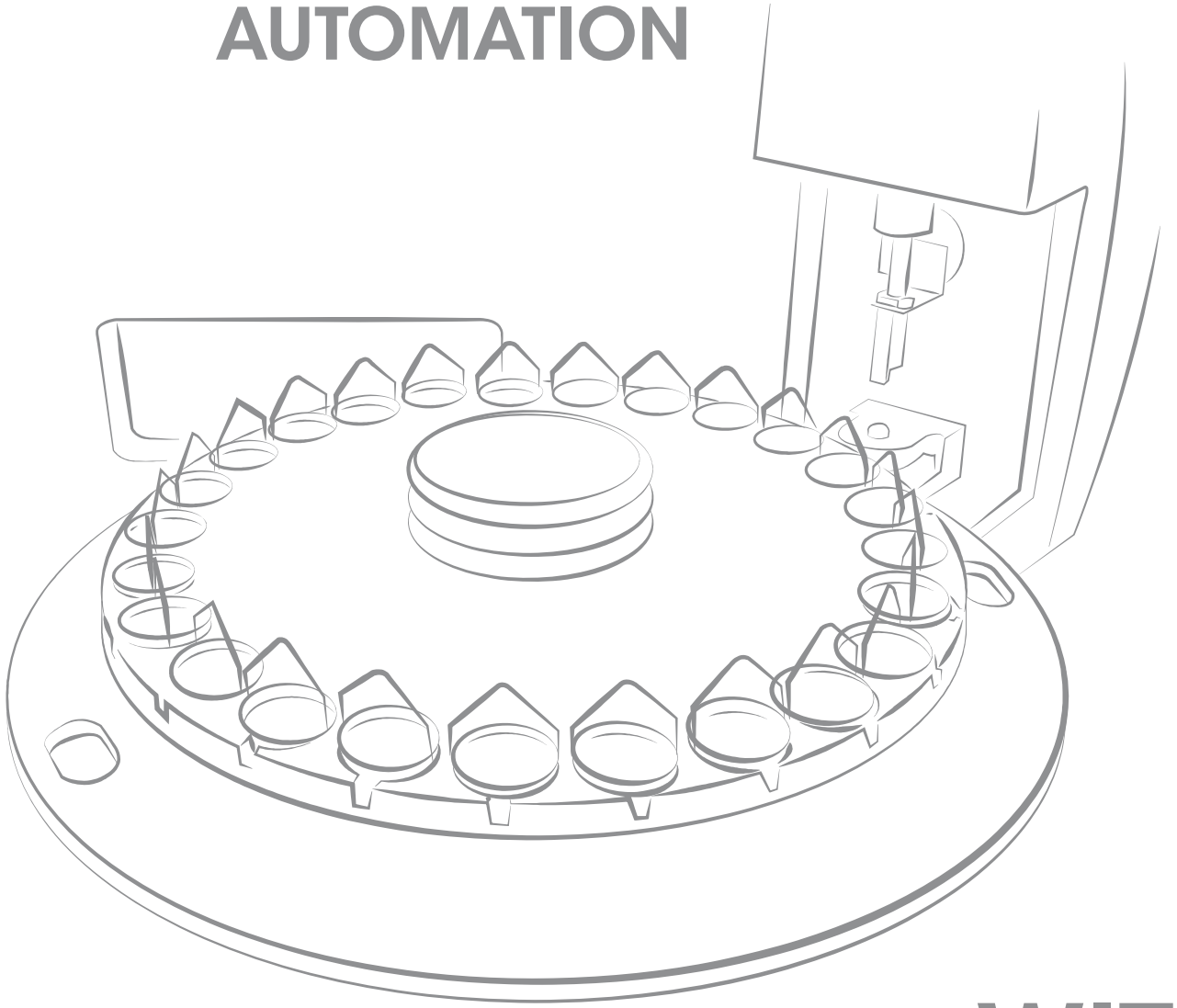
The MOST FLEXIBLE and EFFICIENT ATMOSPHERE CONTROL





PLUS...

RUGGED
and RELIABLE
AUTOMATION

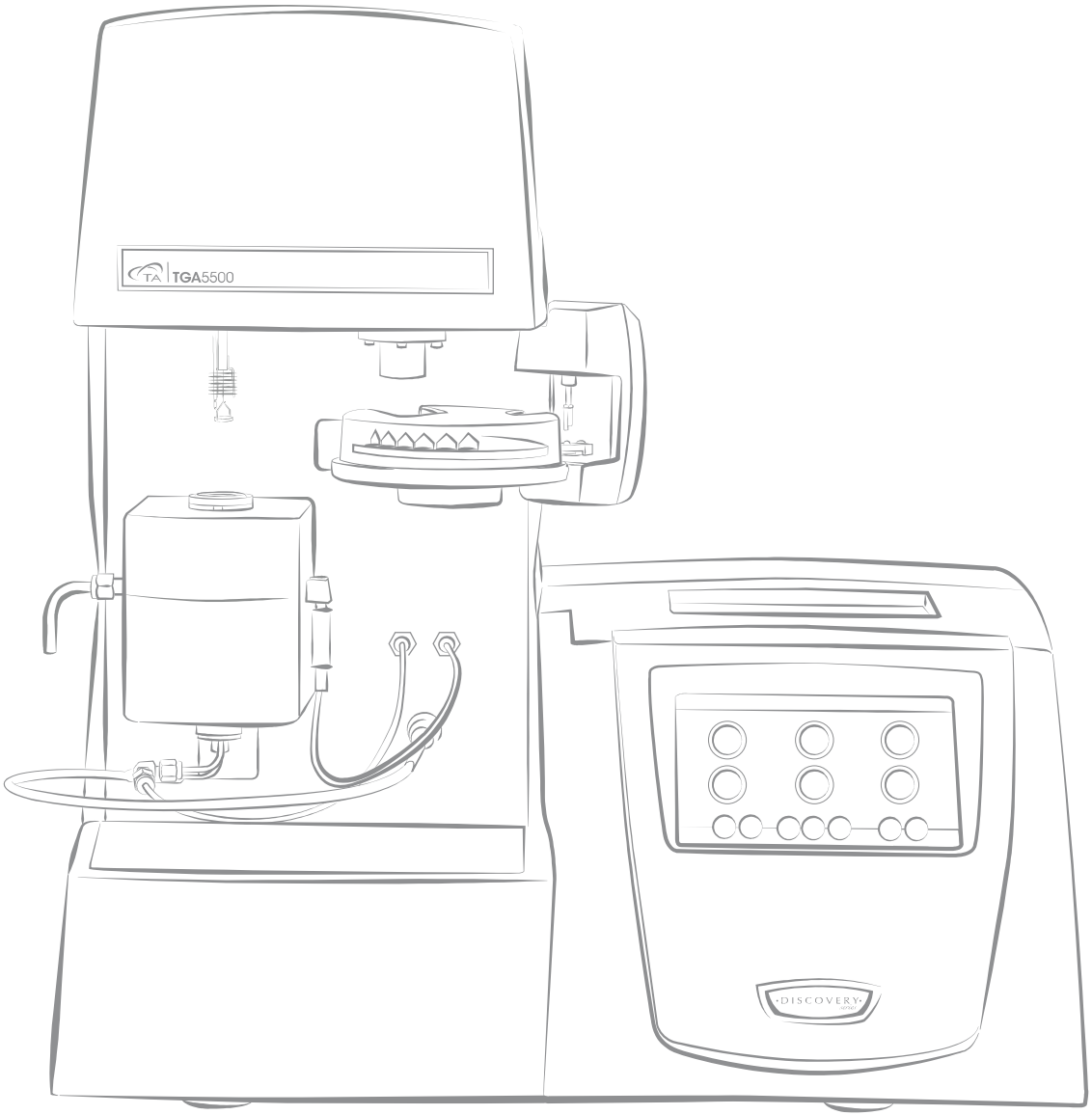


WITH...

The MOST VERSATILE CONTROL and ANALYSIS SOFTWARE

EQUALS...

SUPERIOR TGA PERFORMANCE



Discovery TGA

Thermogravimetric Analysis

TA Instruments invites you to experience the world's finest line of Thermogravimetric Analyzers, the Discovery TGA 55, TGA 550, and TGA 5500. Discover the advanced engineering and attention to detail that provides enhancements in every aspect of TGA technology and a new level of user experience. From the most cost-effective and flexible TGA with industry-leading performance, to the most advanced TGA available, there is a Discovery TGA to meet your needs and exceed your expectations.

TGA55

Premium Performing TGA

The TGA 55 is specifically designed for those that want rugged, reliable, and cost-effective TGA, and are not willing to compromise on performance. Utilizing TA's proprietary Tru-Mass™ Balance as the core of the system, the TGA 55 will outperform competitive research-grade models. Its sensitivity, accuracy and ease-of-use make this TGA an ideal instrument for basic research, teaching or industrial labs that need quality results.

TGA550

Premium performance with advanced options and configuration flexibility

The TGA 550 will not only outperform competitive top-tier systems, but will also give users the flexibility to add advanced features like Hi-Res TGA, MTGA, DTA signal, and our new 25-position autosampler. The performance, flexibility, and ease-of-use make this an excellent TGA for research and multi-user laboratories where a wide variety of TGA experiments are conducted and future expansion of analytical work is anticipated.

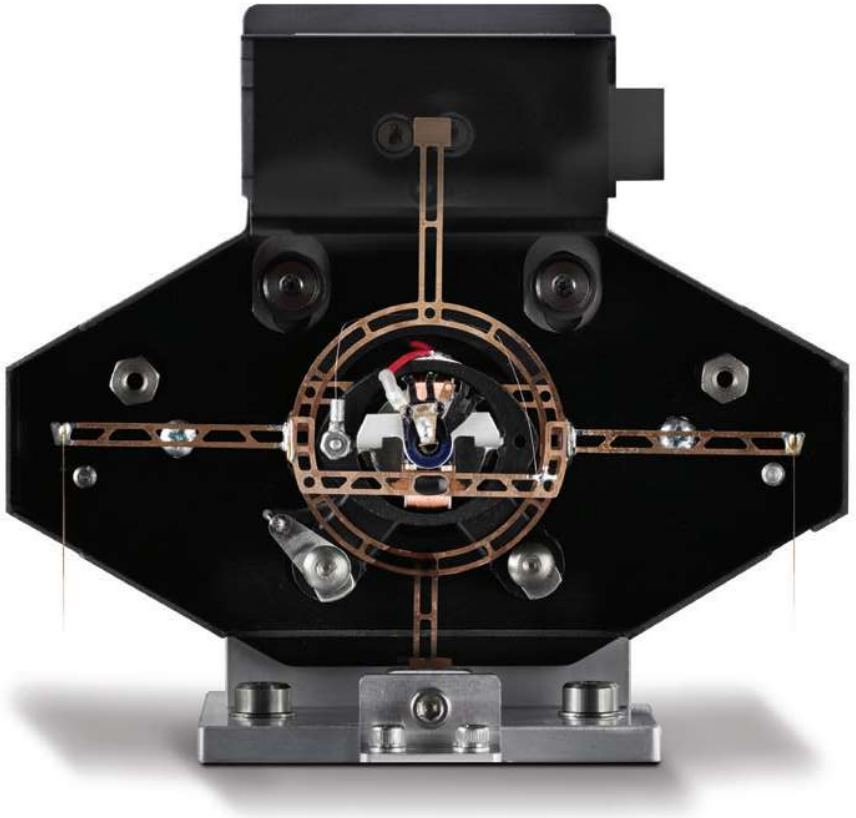
TGA5500

Ultimate performance with every option to meet the requirements of the most demanding applications

The TGA 5500 is designed for the researcher that requires the highest level of performance and features in one package. Built to maximize temperature control and minimize drift, the TGA 5500 has less drift than any competitive TGA – even those using post-test data manipulation! The TA patented IR furnace* delivers the fastest heating and cooling rates available. The all-new autosampler makes high productivity standard.

* U.S. Patent no. 7,416,328 and 7,566,167

No one makes a MORE SENSITIVE and ACCURATE THERMOBALANCE



At the core of every new Discovery TGA is the proprietary Tru-Mass™ Balance. The Tru-Mass Balance system is Thermally isolated for high sensitivity in every laboratory environment, delivers the highest Resolution to separate components of the most challenging TGA samples, and Ultra low drift (Tru-Mass). Unlike competitive designs, the Discovery TGA delivers optimum performance without requiring baseline subtractions and other post-test manipulation required by competitors. The result is an innovative new TGA with unrivaled performance in weight drift and sensitivity.

Balance Features and Benefits:

- Ultra-low drift balance design ensures accurate detection of even the smallest weight changes.
- High capacity (1 g) Tru-Mass balance with auto-ranging capability to ensure the best sensitivity no matter the size of the sample.
- Free-hanging sample eliminates the heat sink prevalent in top-loading designs, for the most efficient heat transfer and gas flow around the sample.
- Thermally isolated balance with low drift and high sensitivity to deliver the most accurate real-time data.

The new proprietary balance system delivers the purest real-time weight data possible.

Low **DRIFT**
High **CAPACITY**
Most **ACCURATE DATA**

WIDEST RANGE of HEATING & COOLING RATES

IR Furnace

EVERY furnace on EVERY system is designed and manufactured by TA specifically for high performance TGA measurements. From the economical high-performing wire wound and EGA furnaces, to the patented IR furnace,* with the industry-leading heating rates, there is a TGA furnace to meet your needs.

The TGA 5500 is the only system offering patented infrared heating technology.

- Ambient to 1200 °C
- Linear controlled heating rates of 0.1 to 500 °C/min
- Ballistic heating rates >1500 °C/min for the highest efficiency available
- Fastest cooling for improved sample throughput
- Low volume, vacuum tight, and quartz lined with heated outlet option for best evolved gas results
- Quartz liner makes furnace easy to clean
- Integrated electromagnet for automated verification and calibration using Curie point standards

* U.S. Patent no. 7,416,328 & 7,566,167

Wire Wound (Pt/Rh) Furnace

Standard furnace for the TGA 55 and TGA 550.

- Ambient to 1000 °C
- Linear controlled heating rates of 0.1 to 100 °C/min
- Ballistic heating rates >600 °C/min
- Low mass furnace allows fast cooling for quick and efficient turn-around between runs

EGA Furnace

Optional Evolved Gas Analysis (EGA) furnace for the TGA 55 and TGA 550.

- Ambient to 1000 °C
- Heating rates of 0.1 to 50 °C/min linear controlled
- Low volume, vacuum tight, and quartz lined for good evolved gas results
- Quartz liner makes furnace easy to clean

All TA furnaces are built to be rugged and reliable and are covered by the industry's ONLY 5-YEAR WARRANTY

BEST SAMPLE–ATMOSPHERE INTERACTION

Discovery TGA's are designed with superior atmosphere control to meet the most demanding applications. Whether maintaining an inert atmosphere, switching to an oxidative purge, or maintaining a high vacuum, the Discovery TGA is up to the task.

Atmosphere Control Features and Benefits:

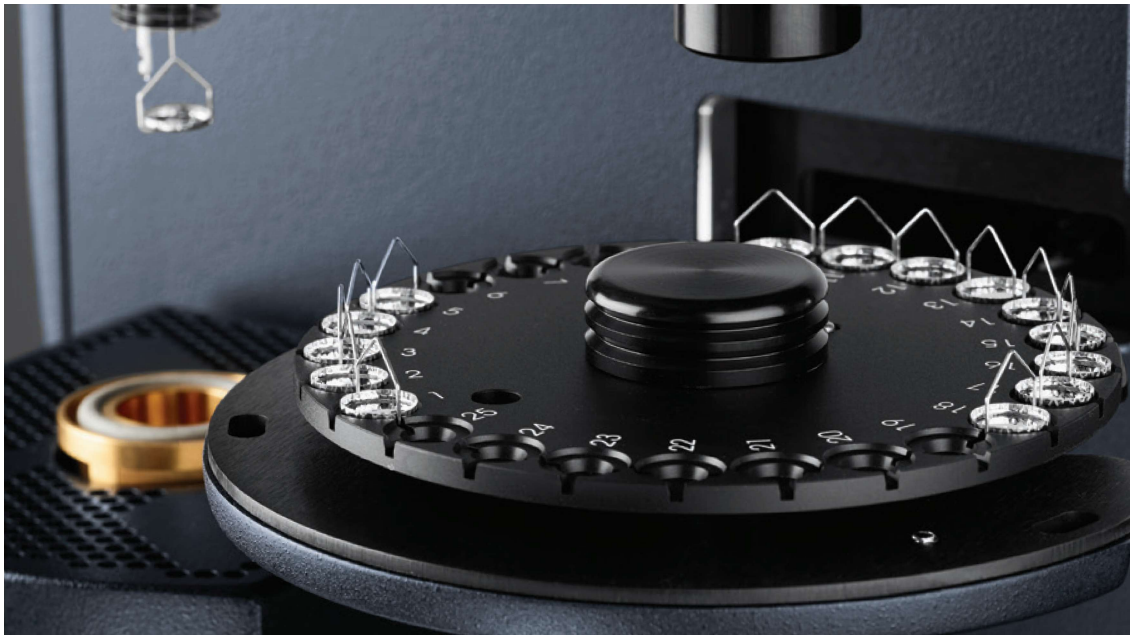
- Innovative Gas-Delivery manifold design eliminates potential leak points from tubing and hardware connections ensuring the most consistent, repeatable atmosphere.
- Integrated software-controlled gas switching for experiments requiring dynamic or reactive atmospheres
- New Gas blending module allows additional inputs of 4 gases with controlled gas switching and blending capability for flexible and demanding applications
- Horizontal purge for best sample interactions
- Vacuum tight to ensure inert, oxygen-free atmospheres
- Sealed pan option to maintain the atmosphere of the sample until the experiment starts

The NEW Discovery TGA features our new 25-position autosampler designed to be the most rugged and reliable system ever developed.

Autosampler Features and Benefits:

- Compatible with all pan types and sizes for ultimate flexibility.
- Sealed pan* and pan punch option for effective isolation of air-sensitive or volatile samples.
- Scheduled and unattended calibrations and verifications give scientists more time for research.
- Integrated electromagnet allows for unattended Curie point calibrations.[1]
- New TRIOS software makes it easier than ever to manage and run a large and diverse sample queue. The Design view and Running queue allow for quick and efficient autosampler programming.

FLEXIBLE DESIGN for ENHANCED PRODUCTIVITY



[1] TGA 5500 only

* U.S. Patent no. 6,840,668

Technology

"APP" Style Touch Screen

One Touch Away™

Touch Screen Features and Benefits:

- Ergonomic design for easy viewing and operation
- Packed with functionality to simplify operation and enhance user experience. The apps-style touch screen includes:
  - Start/stop runs
  - Real-time signals
  - Active method viewing
  - Autosampler calibration
  - System information
  - Test and instrument status
  - Real-time plot
  - Advance method segments
  - Loading/unloading and taring pans

The app-style touch screen, powerful new TRIOS software, the robust and reliable autosampler with automated calibration and verification routines all work seamlessly to dramatically improve laboratory workflow and productivity.

ITS NEVER BEEN EASIER TO GET GREAT DATA!

Technology

Hi-Res™ TGA

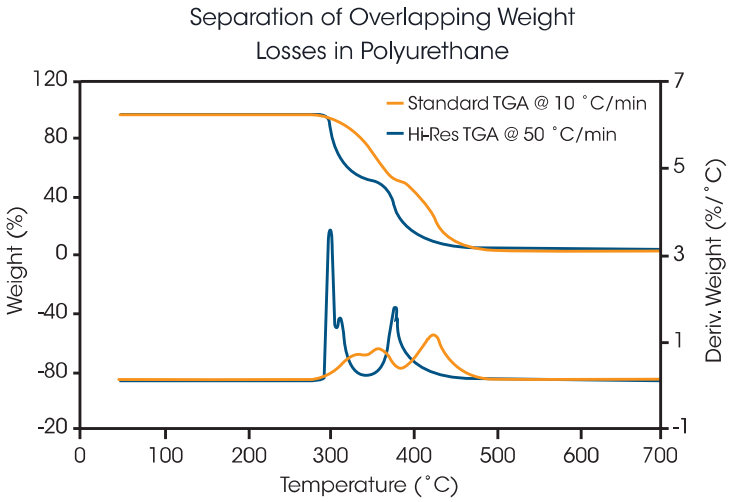
In Hi-Res TGA (only available from TA Instruments), the heating rate is controlled by the decomposition rate of the sample. The Discovery TGA 5500 and 550 designs are ideal for these measurements with rapid response furnaces for precise temperature control, and sensitive thermobalances designed to quickly detect small weight changes.

Benefits of Hi-Res TGA include:

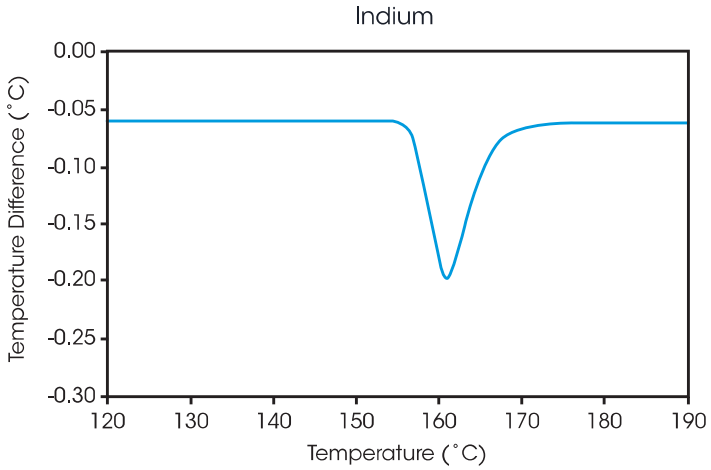
- Separation of broad and overlapping weight losses
- Increased productivity with better resolution
- Rapid survey over wide temperature range with excellent resolution
- Simple method set up

DTA Signal

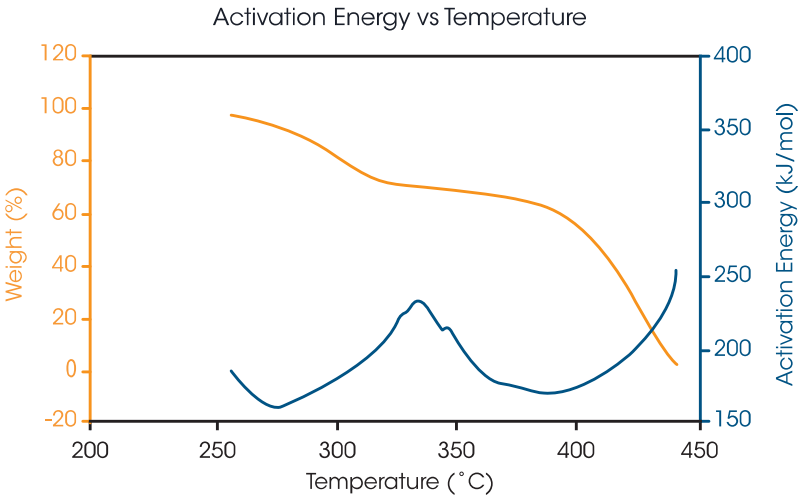
The DTA signal is a qualitative measurement of endothermic and exothermic reactions occurring in the TGA. This signal can also be used for temperature calibration by using melting point standards.



The figure above shows the Hi-Res TGA results for a polyurethane material by standard and Hi-Res TGA. The superior resolution provided by the Hi-Res technique is clearly evident in both the TGA weight loss and the first derivative (DTG) signals. The latter signal is especially useful in defining the onset and the end-set of the individual weight loss segments, as well as indicating subtle events that provide a "fingerprint" of the sample.



DISCOVER more about your MATERIALS



TA's patented MTGA* is another TA Instruments innovation that offers advantages for material decomposition studies. Developed from the proprietary heater control technology utilized by Hi-Res TGA and MDSC, MTGA produces model-free kinetic data. Activation energy can be calculated real-time and studied as a function of time, temperature, and conversion.

Benefits of MTGA include:

- Increased productivity for studying kinetics
- Model-free kinetic data
- Can be combined with Hi-Res for better separation of overlapping weight losses
- Direct measurement of activation energy

The figure to the left shows the MTGA plot from a kinetic study of the effect of temperature on the decomposition of 60 % ethylene vinyl acetate (EVA) in a single analysis. The plot quantitatively shows the EVA decomposition profile and changes in activation energy as functions of temperature. The data supports a dual-step decomposition mechanism. MTGA can also monitor activation energy as a function of conversion, which can infer the mechanism involved.

* U.S. Patent no. 6.113.261 and 6.336.741

Technology

Evolved Gas Analysis

Evolved gas analysis involves the qualitative investigation of the evolved gas products from a TGA experiment. These products are generally the result of decomposition, but can also evolve from desorption, evaporation or chemical reactions. Evolved gas analysis is typically performed by interfacing a mass spectrometer (MS) or Fourier transform infrared spectrometer (FTIR) to the exit port of the TGA furnace. Through the use of a heated transfer line, the evolved gas stream is delivered to the MS or FTIR instrument, and the compositional analysis is performed in real time. TA Instruments offers a 300 amu bench-top, quadrapole mass spectrometer with a heated capillary interface, and TGA module-specific interface kits for the Discovery TGA. A variety of FTIR suppliers provide gas cells and interfaces.

The Discovery TGA is the ideal platform for evolved gas analysis studies. A horizontal purge stream over the sample and a short path to the exit port eliminates dead volume in the furnace, thereby reducing product dilution and optimizing EGA sensitivity. Heated EGA adapters are designed to interface directly with the MS or FTIR transfer line to ensure continuous heating of the offgas stream through the furnace wall, dramatically reducing offgas condensation and improving EGA sensitivity.

TA Instruments TRIOS software supports the importation of MS (trend analysis) and FTIR data (Gram-Schmidt and Chemigram reconstructions), allowing TGA and EGA data to be displayed on a common axis of temperature and/or time.

EGA Features and Benefits:

- Identification of decomposition products
- Additional information for the interpretation of the reactions during TGA scans
- Exact control of the furnace atmosphere before and during experiments

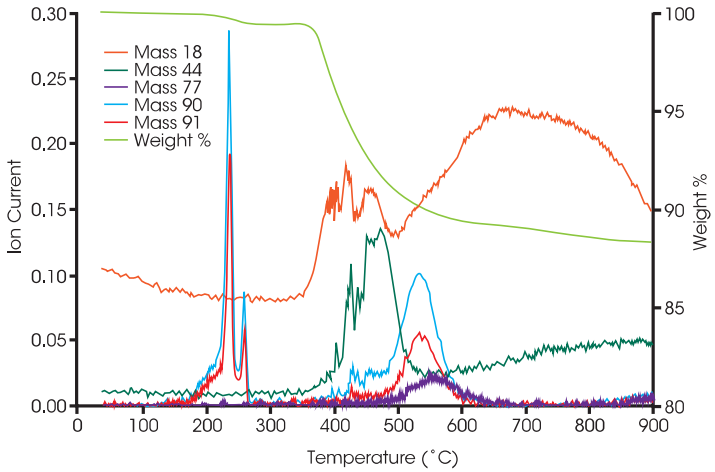
Design Features and Benefits of the Discovery TGA for EGA Analysis:

- Horizontal purge stream over the sample for optimal sensitivity
- Low volume furnace to eliminate dead volume, reducing dilution
- Heated EGA adaptor to eliminate cold spots and condensation
- Powerful TRIOS software allows importation of MS or FTIR data for improved data interpretation

The Discovery MS is a benchtop quadrupole mass spectrometer, designed and optimized for evolved gas analysis. It features industry-standard technology configured for the efficient transfer, and rapid detection of offgas from the TGA furnace. Parts per billion (ppb) sensitivity is ensured with our state-of-the-art quadrupole detection system, including a closed ion source, a triple mass filter and a dual (Faraday and Secondary Electron Multiplier) detector system. This analyzer configuration is selected to optimize sensitivity and long-term stability performance.

Control of the experimental parameters and analysis of the mass spectral data is achieved through a user-friendly, recipe-driven software interface. Data collection can be triggered directly from the TGA software, and the resulting MS data can be combined with the corresponding TGA results for direct overlaying and comparison.

Parameter	Performance
Mass range (amu)	1-300
Mass Resolution	>0.5 amu
Sensitivity	< 100 ppb (gas-dependent)
Ionization Source	Electron Ionization
Detector System	Dual (Faraday and Second Electron Multiplier)
Sample Pressure	1 atm (nominal)
Data Collection Modes	Bargraph and Peak Jump
Scanning Speed	
Bargraph Mode	>50 amu/s
Peak Jump Mode	>64 channels/s
Transfer line Temperature	300 °C (fixed)
Transfer line	1.8 meters, flexible
Filaments	Dual, customer changeable
Capillary	Stainless Steel, changeable
Capillary size	I.D. = 0.22 mm
Inputs	Data collection controlled by TGA Trigger



Choose the BEST TGA for YOUR NEEDS

Instrument Features	TGA 55	TGA 550	TGA 5500
Low Mass IR Furnace	—	—	●
Hi-Res TGA™	—	O	●
Modulated TGA™	—	O	●
Auto-Stepwise TGA	●	●	●
DTA Signal	—	O	●
Auto-loader	●	●	—
25-Position Autosampler	—	O	●
Sealed Pan Punch	—	O	●
Color App-Style Touch Screen	●	●	●
Long-Life Wire Wound (Pt/Rh) Furnace	●	●	—
EGA Furnace Capable	O	O	●
Dual Input Gas-Delivery Manifold	●	●	●
Integrated Electromagnet	—	—	●
Temperature Calibration Curie Point (ASTM E1582)	●	●	●
Temperature Calibration Melting Point Standards	—	O	●
4-Gas Blending Module	—	O	O
Heated EGA Furnace Adapter	—	—	O
TGA/MS Operation	O	O	O
TGA/FTIR Operation	O	O	O

● Included O Optional — Not Available

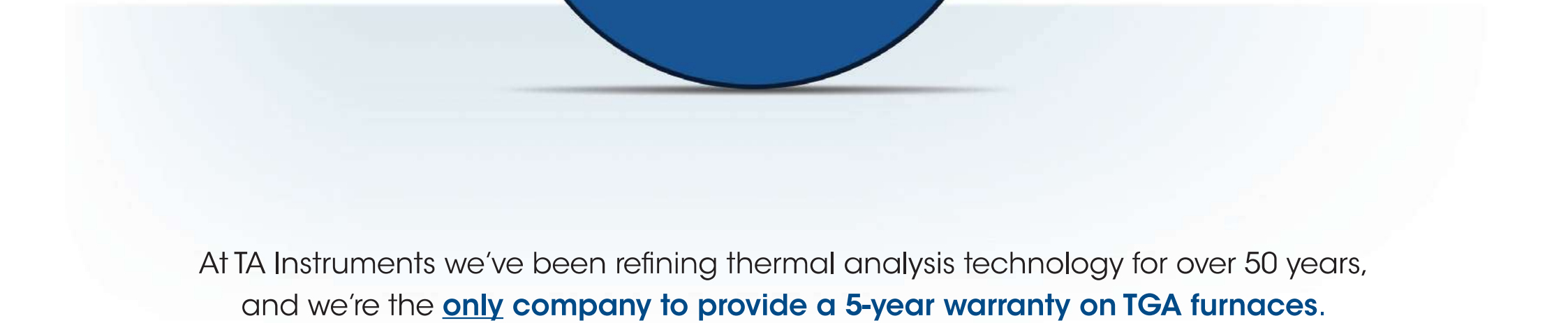
Instrument Specifications	TGA 55	TGA 550	TGA 5500
Temperature Range	Ambient to 1000 °C	Ambient to 1000 °C	Ambient to 1200 °C
Temperature Accuracy	±1 °C	±1 °C	±1 °C
Temperature Precision	±0.1 °C	±0.1 °C	±0.1 °C
Heating Rate (Linear)	0.1 to 100 °C/min	0.1 to 100 °C/min	0.1 to 500 °C/min
Heating Rate (Ballistic)	>600 °C/min	>600 °C/min	>1600 °C/min
Furnace Cooling (Forced air/N2)	1000 °C to 50 °C in <12 min	1000 °C to 50 °C in <12 min	1200 °C to 35 °C in <10 min
Sample Weight Capacity	1000 mg	1000 mg	1000 mg
Dynamic Weighing Range	1000 mg	1000 mg	1000 mg
Weighing Precision	±0.01 %	±0.01 %	±0.01 %
Resolution	0.1 µg	0.1 µg	<0.1 µg
Weight Baseline Drift[1] (Ambient to 1000 ˚C)	<25 µg	<25 µg	<10 µg
Vacuum	50 µTorr (EGA furnace)	50 µTorr (EGA furnace)	50 µTorr

[1] Without baseline subtraction

Pan specifications

Material	Size	Temperature Range	Notes
Platinum	50 µL 100 µL	Ambient to 1000 °C	Robust, high performance, reusable pans
Ceramic	100 µL 250 µL	Ambient to 1200 °C	Reusable pans for higher temperatures
Aluminum	80 µL	Ambient to 600 °C	One-time use, can be sealed to prevent volatilization before experiment

The ONLY 5 YEAR WARRANTY



At TA Instruments we've been refining thermal analysis technology for over 50 years, and we're the **only company to provide a 5-year warranty on TGA furnaces**.

Expert **Training**
& Expert **Support**
WORLDWIDE

AMERICAS

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- Prague, Czech Republic
- Sollentuna, Sweden
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