Ellutia
Chromatography Solutions

The 500 Series GC

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WELCOME TO ELLUTIA CHROMATOGRAPHY SOLUTIONS

We are an independent manufacturer of innovative chromatography instruments. Established in 1994 and formerly known as Cambridge Scientific Instruments Ltd, the company renamed as Ellutia Chromatography Solutions in 2010 and now have divisions in the UK, USA and Germany. Since then we have gone from strength to strength and supply our light, compact, yet highly sensitive GCs to a broad range of markets including education, brewing, materials testing and forensics.

We pride ourselves on our personalised, responsive service and ability to provide customised solutions to our customers' challenges. Offering an ideal combination of agility and speed of service with a global outlook, and industry-shaping technological innovations, we have become the partner of choice for hundreds of customers.

Our instruments are designed and manufactured in the UK at the company headquarters in Ely, Cambridgeshire. The instruments are designed to be compact with great energy efficiency, whilst also delivering industry standard analytical performance.

Ellutia GC History

March 2017 Ellutia release 500 Series GC at Pittcon, our first GC to offer conventional air blown and ultra-fast direct heated chromatography functionality in one instrument

February 2017 Ellutia moves to new premises on Ely Business Park, Cambridge

2010 Cambridge Scientific Instruments rebrands to Ellutia

2007 300 Series GC, standalone ultra-fast GC System based around the concept of directly heating metal columns, released

2000 200 Series GC with patented Heat Recovery heating system released

1997 Cambridge Scientific Instruments work on the development of the EZ-Flash and EZ-Flash II Ultra-Fast GC Accessories

1994 Phillip James starts Cambridge Scientific Instruments after leaving Pye Unicam head of the chromatography division

THE 500 SERIES

Developed and manufactured at our UK HQ, the 500 Series Gas Chromatograph is a unique new concept in gas chromatography. The machine can perform conventional, fast and ultra-fast GC, removing the requirement for multiple instruments. This is the only GC machine that can offer this flexibility for the customer.

Simple to Use

The 500 series user interface offers a walk through guide to the common tasks that the machine is likely to be used for and also some of the general requirements such as replacing columns. This allows even users with little GC experience to perform general maintenance tasks to help maximise instrument uptime.

Simple to Maintain

Our developers have built the machine to be more modular so that servicing times are reduced to a minimum. This will help to futureproof the equipment for years to come and will keep downtime of the 500 series very low compared to more conventional pieces of equipment.

More Flexible

Thanks to the lower cost and smaller footprint, multiple 500 Series GCs can be installed on the same bench space as a single traditional GC. This allows different methods to be run on each instrument rather than being confined to a single method on a traditional 2 channel instrument.

Specification

Ellutia 500 Series v Standard Traditional GC Comparison

	500 Series GC	Conventional GC
Size	(h) 45 x (w) 22 x (D)57 cm	(h) 50 x (w) 58 x (D)54 cm
Weight	18Kg	45Kg
Power Consumption	1200W	2950 VA
Typical Analysis Time	5 min (in ultra-fast mode)	30 min

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CONVENTIONAL & FAST CHROMATOGRAPHY MODE

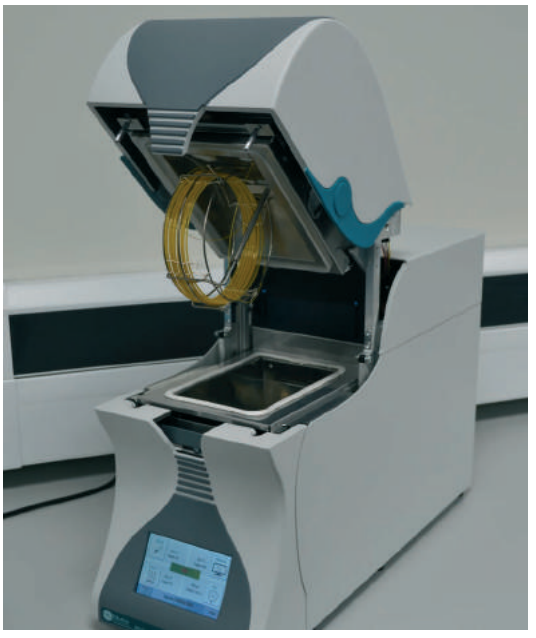
The Heating Technology

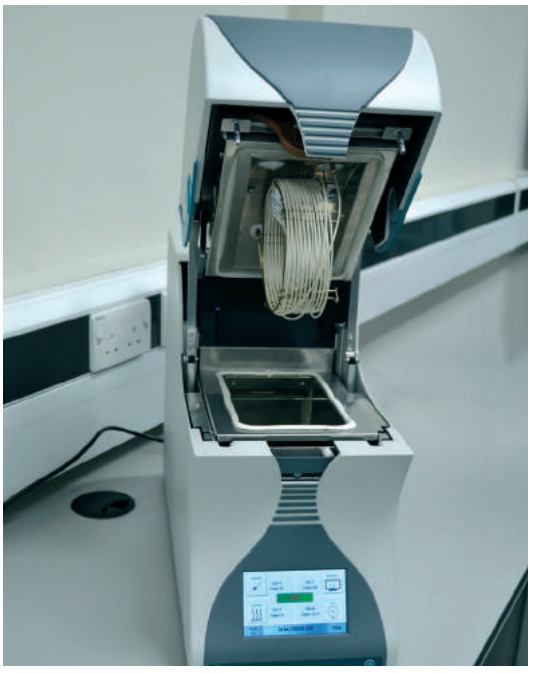
Air is drawn in and passes through a heat exchanger and heater that warms the air. This then circulates in the oven and passes back out via the heat exchanger. As the hot air passes out through the heat exchanger it passes the heat to the incoming air. This retains much of the heat and energy within the instrument greatly reducing energy consumption and increasing efficiency.

When the GC run is completed the incoming air can be diverted to bypass the heater and heat exchanger to rapidly cool the oven. The flow through oven also makes the use of hydrogen carrier gas safer as it prevents any potential build ups cause by leaks in the column oven.

Column Oven Temperature Distribution

Consistent and even temperatures are essential to good gas chromatography. The 500 Series GC oven has been designed and tested to ensure a consistent and even temperature profile throughout the entire oven.





Column Choice

- The 500 Series GC can accept almost all conventional capillary columns from most manufacturers.
- The 500 Series GC can also use packed columns where the application requires.

Temperature Heating Rates

- 35-150°C up to 50°C/min
- 150-240°C up to 30°C/min
- 240-300°C up to 20°C/min
- 300-350°C up to 5°C/min

Temperature Cool Down Rates

- 350-50°C in 7 min

Conventional v Fast

	Conventional	Fast
Column Heating Type	Air Blown Oven	Air Blown Oven
Typical Column Heating Range	1-40°C/min	20-50°C/min
Typical Column Length	15-60m	5-20m
Typical Column ID	18-530µm	100-180µm
Typical Analysis Time	20-90 min	5-10 min
Peak Width	5-10 sec	0.1-3 sec

ULTRA-FAST CHROMATOGRAPHY MODE

The 500 Series GC can also perform ultra-fast chromatography when used with metal ultra-fast GC columns. When in ultra-fast mode rather than using the hot air oven to heat the column, an electrical current is passed directly though the column resistively heating it. This allows for significantly faster temperature ramping, and then because only the column has been heated rather than an entire oven, the cool down time is greatly decreased.

Why choose Ultra-Fast GC from Ellutia?

You can use ultra-fast GC without needing to invest in a machine that only gives you this capability as you can use existing columns and methods in conventional mode with the 500 series. The 500 series also enables you to perform fast GC in the same machine therefore offering all three GC technologies in one small and affordable piece of equipment. This removes the limitations of space in a lab or field environment where space is the determining factor.

Sample throughput is increased 5-10 times in ultra-fast mode, meaning that the 500 series can perform the work of several conventional GCs and give faster return on investment for lab managers. The reduced energy consumption that the 500 series offers results in lower energy bills and a reduced CO_2 footprint.

The Heating Technology

Recent advances in column technology means that it is now possible to to get most commonly available columns mad of deactivated stainless steel rather than fused silica.

By applying an electrical current directly to the column we are able to resistively heat the column directly. There is no additional heater the column is the heater. This allows for incredibly rapid temperature ramping with an upper temperature limit governed by that of the column, and when it comes to cool down because only the column is hot not an entire oven, there are extremely fast cool down times. By only heating the column, energy consumption is greatly reduced compared to conventional chromatography.

Consistent and even temperatures are essential to good gas chromatography. Columns are sheathed in insulation to ensure consistent temperature profiles across the entire column. The air-blown oven can be used to aid with temperature stability at low end and for accurate calibration of ultra-fast heating.

Column Choice

- Most common phases are available
- Unlike other technologies that rely on column modules, columns can be trimmed and reused if the front end becomes contaminated.

Temperature heating rates

- Heating at up to 1000°C/min

Temperature cool down rates

- 400 to 50°C in 3 min

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INLET AND DETECTORS

Temperature Programmable Injector

The 500 Series GC comes equipped with a temperature programmable detector as standard. The injector can be used as a conventional split/split-less injector isothermally. The injector also has the capability to be rapidly heated to temperatures of up to 600ºC at rates of up to 720ºC/min.

Injector Specification

- Temperature programmable with split/split-less capabilities
- 10 programmable ramps
- Temperature range ambient + 20ºC to 600ºC
- Maximum isothermal temperature 420ºC
- Maximum ramp rate 720ºC / min

Detector Details

At launch the 500 Series GC will be available with a FlD detector, with other options available:

- FID
- ECD
- TEA
- FPD
- Mass Spec

SOFTWARE AND ACCESSORIES

Ellution

Developed in conjunction with DataApex, Ellution Chromatogrpahy Data Station is an advanced chromatography software package for data acquisition, processing and instrument control. Its wide range of data acquisitions interfaces allows connections to any gas or liquid chromatograph.

The key benefits of Ellution:

- Makes collecting and processing data from Ellutia's instruments quick and simple
- Easy to generate accurate reports due to the clear structure and intuitive graphical user interface
- Full control of Ellutia gas chromatographs is included as standard optional extensions enable implementation of specific methodologies.

Ellutia also offers Ellution hardware for a variety of requirements, including A/D converters for data acquisition, control boards for LC control and precise analogue signal generator devices. This hardware can be synchronised with Ellutia's autosampler or chromatograph, or can be supplied as standalone hardware.

MARKET SEGMENTS

The 500 series is ideal for laboratory professionals who require the conventional GC functionality but with the benefits that ultra-fast GC can offer all in one machine. Having the capability in one machine removes the limitations of both space and time in the lab. UFGC is particularly useful for applications which require rapid and repeated analysis of samples.

For applications where the speed of the result is critical, the 500 Series GC can offer great advantages. For example, the ability to rapidly quality check a delivery can reduce delays and the cost of a drivers waiting time.

Where multiple data points are required, ultra-fast GC can provide an effective reaction monitoring solution providing accurate data several times over an hour to enable the technician to analyse more effectively before 'analyse the results.

Due to the size and power consumption of the product, the 500 Series is ideal for mobile lab applications such as on-site analysis where space is limited.

Markets have included:

Environmental/Pesticide

Use: Screening analysis of samples where results can be rapidly examined and a same day turnaround can be guaranteed. The analysis can be repeated to provide confirmation of the results faster than traditional GC methods.

Petrochemical

Use: Simulated distillation by ultra-fast GC in accordance with ASTM-D7798

Pharmaceutical

Use: Rapid analysis of residual solvents in waste water streams.

Clean-up Monitoring

Use: Fast determination and repeat analysis of possible residue materials where clean processing equipment is a requirement. An example of an industry where this technique is valuable is the essential oils manufacturing sector.

Brewing

Use: In the brewing industry, GC is used to determine flavours (including detecting 'off' flavours) and for quality control to ensure a beer is ready to leave fermentation.

TRAINING SERVICES

The Ellutia GC Excellence Academy

Housed at the Ellutia HQ, Ellutia has a dedicated training centre. The Ellutia Excellence Academy hosts training courses by RSC-approved independent trainer, Anthias Consulting, as well as Ellutia-led sessions by Ellutia's technical experts.

Ellutia offers a range of training sessions across all levels, from bespoke courses to sessions that cover key application areas including: brewing, food safety, petrochemical and environmental analysis.

The training benefits scientists, students and researchers in mastering the use of modern gas chromatography instruments and maximising their potential. Ellutia's deep heritage and expertise in GC techniques and close relationships with customers means there is maximum emphasis on equipping GC users with the insight they need.

Upcoming training sessions will cover the following areas:

Cannabis Analysis

Register your interest for the next cannabis analysis course here: www.ellutia.com/training/cannabisanalysis

Brewing Analysis

Register your interest for the next brewing analysis course here: www.ellutia.com/training/brewinganalysis

Ultra-Fast GC

Register your interest for the next ultra-fast GC course here: www.ellutia.com/training/ultrafastgc

Ellution Training

Register your interest for the next Ellution training course here: www.ellutia.com/training/ellution

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