

# Hypoxia/Cell Culture Workstations



# 01 | Our Credentials

*Don Whitley started his career in microbiology and haematology laboratories, before moving into the sale of laboratory products. This experience helped him to develop novel ideas for improving the working life of scientists through the use of labour-saving equipment and automated solutions, leading to the formation of Don Whitley Scientific Limited in 1976.*



We continue to design, develop and manufacture our products in the UK and have been granted patents for many of our innovations. We now offer a range of controlled atmosphere workstations for cultivation of mammalian cells under physiologically appropriate conditions of normoxia or hypoxia. This product line has recently been enhanced by the introduction of our internal HEPA filtration system, which combines precise atmospheric control with cleanroom conditions for cell culture

Our product range has been sold in over 50 countries through our worldwide network of distributors.

**For more information on any of our additional services, please contact us:**

**+44 (0)1274 595728 or [sales@dwscientific.co.uk](mailto:sales@dwscientific.co.uk)**







*Our greatest assets are our satisfied customers...*

I bought a Whitley Workstation when I worked in London. I was so pleased with the product that when I moved to Denmark, I ordered another one. It is a beautifully well thought through and reliable product – it simply does what it says it does.

*Janine Erler, Biotech Research and Innovation Centre, University of Copenhagen, Denmark.*

The precise control of oxygen tension by the H35 has improved the quality of our results considerably. Also, a previous instrument I used did not have the facility to programme cycling oxygen tensions, so the H35 has opened up a new avenue of research for us.

*Dr Dan Tennant, Hypoxia and Metabolism Group, School of Cancer Sciences, University of Birmingham*

# 03 | The Fastest Oxygen Control on the Market

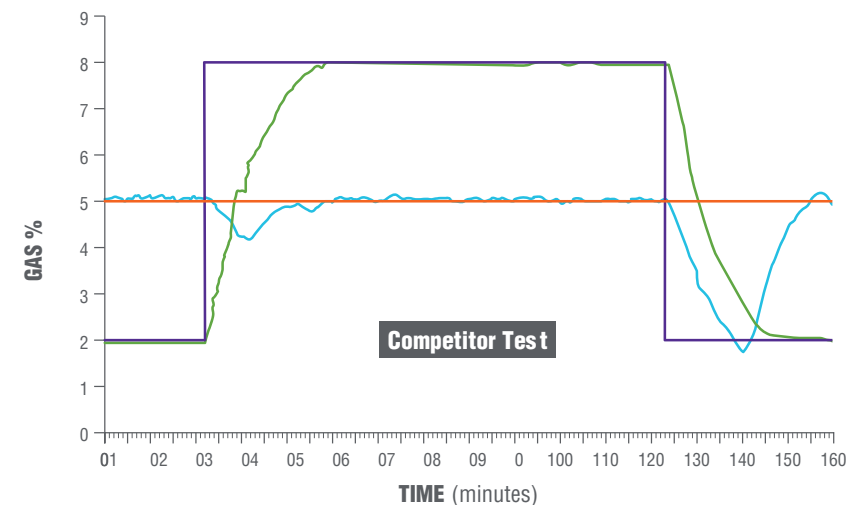
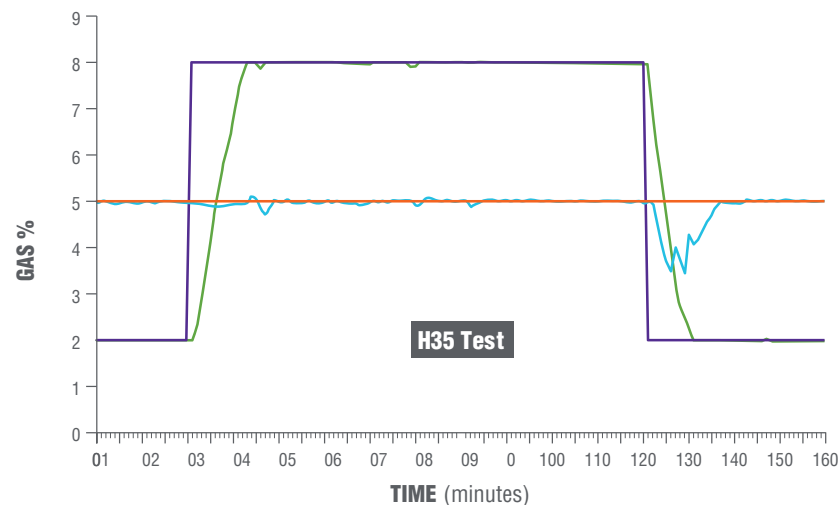
*If you need a workstation that responds rapidly to changes in oxygen set point, read on. We have conducted tests that lead us to believe that no other manufacturer's hypoxic workstations are able to offer the same accuracy and speed of response to set point changes as those achievable in Whitley Workstations.*

The Whitley Hypoxic Workstations allow the control of oxygen concentration in 0.1% increments over the range 0 to 20% and the control of carbon dioxide concentration in 0.1% increments over the range 0 to 15%. Unlike workstations produced by some other manufacturers, the sophisticated control mechanisms used in Whitley H range workstations allow the selected gas mixture to be rapidly and accurately attained and adjusted.

To document the speed with which atmospheric oxygen concentrations can be changed in an H35 workstation, we conducted tests in our own laboratory and used the workstation's data logging facility to record the results during the test period.

These graphs demonstrate that the Whitley H35 Hypoxystation responds very rapidly to changes in oxygen set point. Due to the influx of gas (air or N<sub>2</sub>) after a change in O<sub>2</sub> set point, there is an inevitable brief, temporary decrease in CO<sub>2</sub> concentration. However, the H35 control mechanisms ensure that this decrease is minimised and the original CO<sub>2</sub> set point is regained quickly. Furthermore, this accuracy is achieved over the full range of operating conditions, including very low oxygen concentrations (0.1 to 1.0%).

We recommend that anyone considering the purchase of an apparently similar workstation should request equivalent oxygen control data from the manufacturer for comparative purposes.



**KEY**

■ O<sub>2</sub> Set Point

■ O<sub>2</sub>

■ CO<sub>2</sub> Set Point

■ CO<sub>2</sub>

# Whitley Hypoxystations | 04

## Whitley DG250

The DG250 Workstation can be operated as a hypoxic chamber simply by attaching a cylinder of the required gas mixture. The DG250 is ideal for short term projects and one-off experiments, or when budgetary constraints necessitate a small, cost-effective workstation for a variety of applications.

### FEATURES

- 214 litre capacity incubation chamber.
- User portholes act as two mini-airlocks so you can transfer samples at the same time as entering/exiting the chamber.
- The whole top can be removed for thorough cleaning between experiments and for the transfer of bulky items of equipment.
- Complete interior is temperature controlled and can be set between 5°C above ambient and 45°C.
- Supplied with automatic dehumidifier – no user maintenance necessary.
- Three types of single sample entry options are available.
- Single cylinders of pre-mixed gas should be used - no gas mixing capability.

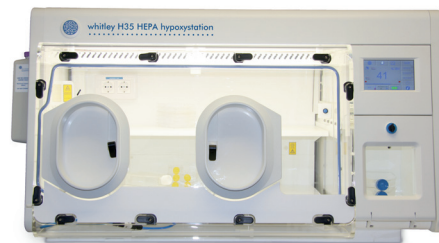


## Whitley H35

The H35 Hypoxystation creates hypoxic and anoxic conditions within a controlled and sustained workstation environment. It is ideal for cell and tissue culture researchers wanting to accurately control oxygen, carbon dioxide, temperature and humidity. This Hypoxystation has a generous 300 litre capacity.

### FEATURES

- Control O<sub>2</sub> in 0.1% increments up to 20%; CO<sub>2</sub> in 0.1% increments up to 15%; and RH up to 80% for flexibility in your research and confidence in your results.
- Colour touchscreen control panel for ease of use and for visual display of parameters including airlock cycle status.
- Integral 12 litre airlock accommodates up to 44 x 96 well plates or 84 x T25 culture flasks and completes a cycle in only 60 seconds.
- Gas mixing achieved instantly via a unique, fully integrated control system – rapidly create your selected environmental conditions and minimise bench space required.
- Easy, accurate, 2-point oxygen sensor calibration.



## Whitley H35 HEPA

This Hypoxystation is ideal for those requiring a cell culture workstation with a high level of HEPA filtration. The H35 HEPA has the same innovative features as the H35 to ensure accurate control of oxygen, carbon dioxide, temperature and humidity. It has a 300 litre chamber and an integral 12 litre airlock.

### FEATURES

- Fitted with the unique Whitley Internal HEPA Filtration System where all the atmosphere passes through the filter every 4 seconds, cleaning the chamber environment quickly.
- Filters are located inside the Hypoxystation chamber to help prevent them becoming saturated.
- Easily exceeds the level of atmospheric cleanliness stipulated by Class 3 of ISO 14644
- Removable front and CO<sub>2</sub> monitoring fitted as standard.
- Tested against a competitor system, proved that the surface area of the Whitley HEPA Filter is 250x larger; the filtration rate 75x higher and the flow rate 30x better.
- Ethernet-enabled for remote access.



## Whitley H45

The H45 provides the facility to mimic in vivo conditions, providing a continuous cell culture environment that eliminates cellular stress linked to variations in temperature, pH levels and oxidation – resulting in better cell lines. The 3-port workstation features a unique Whitley Instant Access Port and has a 450 litre capacity. The 12 litre airlock will accommodate a variety of pipettes, culture flasks and electrical equipment for use in the chamber.

### FEATURES

- Control O<sub>2</sub> in 0.1% increments up to 20%; CO<sub>2</sub> in 0.1% increments up to 15%; and RH up to 80% for flexibility in your research and confidence in your results.
- Fitted with 2 patented oval ports for freedom of movement and operator comfort plus an Instant Access Port for rapid access to your samples.
- With three ports you have convenient access to the entire incubation and working areas.
- Fitted with a removable front to allow for thorough cleaning and the transfer of bulk samples and equipment for use in the Hypoxystation.
- Full colour touchscreen control panel for ease of use and display of parameters such as O<sub>2</sub> and CO<sub>2</sub> levels.
- Available with fully automatic humidification system so you can add moisture and maintain a sterile environment.



## Whitley H45 HEPA

This is a large, 3-port workstation with all the innovative features of the H45 but with the added feature of HEPA filtration that has been tested against a competitor system and proven to be substantially superior. Accurately control O<sub>2</sub>, CO<sub>2</sub>, temperature and humidity whilst ensuring your samples are protected in physiologically relevant conditions.

### FEATURES

- Fitted with the unique Whitley Internal HEPA Filtration System. Levels of atmospheric cleanliness inside the Hypoxystation exceed the requirements of ISO 14644 Class 3.
- Tested against a competitor system, proved that the surface area of the Whitley HEPA Filter is 250x larger; the filtration rate 75x higher and the flow rate 30x better.
- 12 litre airlock can accommodate up to 44 x 96 well plates or 84 x T25 culture flasks and takes only 60 seconds to complete a cycle.
- Fully automatic de-humidification system that requires no operator intervention.
- Three ports provide convenient access to the entire incubation and working areas.
- Removable front and CO<sub>2</sub> monitoring fitted as standard.
- Fitted with a fan that circulates the internal atmosphere continuously – contributing to even temperature distribution.





## Whitley H135

The H135 is the tallest, widest, deepest hypoxic chamber in the Whitley range. It has a usable internal volume of almost 600 litres and can accommodate a variety of items of equipment such as live cell imaging devices, microscopes, plate readers, etc. The generous internal height facilitates easy pipetting. All cell manipulations can be performed without removing them from your required hypoxic conditions.

This workstation provides precise environmental control whilst leaving plenty of room to work, incubate and conduct analysis.

### FEATURES

- Fitted with 2 patented, oval ports fitted with sleeves, for greater freedom of movement and operator comfort.
- Large removable front fitted with either two or three ports.
- Innovative full colour touch screen that is Ethernet-enabled for remote access.
- Intelligent 12 litre airlock – no risk of compromising conditions inside the chamber (and it's flushed with nitrogen as an additional cost saving).
- As with some of our other Hypoxystations, the option of being connected to a Whitley i2 Instrument Workstation.
- Precise control of O<sub>2</sub>, CO<sub>2</sub> and N<sub>2</sub>.
- Automated O<sub>2</sub> calibration.
- Bespoke trolley included.



## Whitley H135 HEPA

The H135 is the tallest, widest, deepest hypoxic chamber in the Whitley range. It has a usable internal volume of almost 600 litres and can accommodate a variety of items of equipment such as live cell imaging devices, microscopes, plate readers, etc. The generous internal height facilitates easy pipetting. All cell manipulations can be performed without removing them from your required hypoxic conditions.

This workstation provides precise environmental control whilst leaving plenty of room to work, incubate and conduct analysis.

### FEATURES

- Precisely control O<sub>2</sub> in 0.1% increments up to 20%; CO<sub>2</sub> in 0.1% increments up to 15%; and RH up to 80% for flexibility in your research and confidence in your results.
- The Whitley Internal HEPA Filtration System with Enhanced Biological Containment.
- Large removable front fitted with either two or three ports.
- Innovative full colour touch screen that is Ethernet-enabled for remote access.
- Intelligent 12 litre airlock – no risk of compromising conditions inside the chamber (and it's flushed with nitrogen as an additional cost saving).
- As with some of our other Hypoxystations, the option of being connected to a Whitley i2 Instrument Workstation.
- Gas mixing achieved instantly via a unique, fully integrated control system - rapidly create your selected environmental conditions and minimise bench space required.
- Bespoke trolley included as standard.
- Fully automated oxygen sensor calibration that takes only 8 minutes to complete. Keeps the sensor in a stable environment, not subjecting it to frequent changes in humidity and temperature and prevents the risk of condensation on the sensor.

## Whitley i2 Instrument Workstation

The Whitley i2 Instrument Workstation enables scientists to use Seahorse Extracellular Flux (XF) Analysers in hypoxic conditions. The i2 has been developed specifically to meet the precise requirements of the XF Analyser. This workstation can be used as a stand-alone unit or connected to a Whitley Hypoxystation via the Whitley Transfer Tunnel, enabling preparation of cell lines under hypoxic conditions and their transfer directly into the i2 without exposure to air. Another unique feature is the integral incubator, which enables you to precondition cellware and incubate plates and media at 37°C under the same atmospheric conditions as the XF Analyser.

### FEATURES

- Maintains an integral temperature no higher than 28°C, excludes carbon dioxide and provides precise oxygen control.
- Equipped with a generous working area in which to conduct preparatory work and supplied complete with removable front, internal mains sockets and a wireless footswitch to control the patented oval ports.
- 12 litre airlock, with a cycle time of just 60 seconds, accommodates up to 44 x 96 well plates or 84 x T25 tissue culture flasks plus numerous other flasks, pipettes and laboratory consumables.
- An integral 37°C incubator that can accommodate up to 8 x 100ml Duran bottles.
- The combination of a Whitley i2 Instrument Workstation and Seahorse XF Analyser permits simultaneous, real-time analysis of mitochondrial respiration and glycolysis in mammalian cells under precisely controlled hypoxic conditions.





## Whitley H85

Used for a variety of cell culture applications, the H85 Hypoxystation accurately controls O<sub>2</sub>, CO<sub>2</sub>, temperature and humidity to create hypoxic and anoxic conditions.

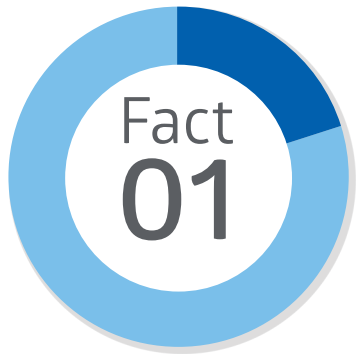
It has a large 295 litre capacity and a very generous airlock. This workstation is available with an optional refrigeration unit designed to operate at 8°C (although other set temperatures are available if required). The H85 is ideal for use in university laboratories, hospitals and cancer research facilities.

### FEATURES

- Control O<sub>2</sub> in 0.1% increments up to 20%; CO<sub>2</sub> in 0.1% increments up to 15%; and RH up to 80% for flexibility in your research and confidence in your results.
- Fitted with patented, oval ports fitted with sleeves, for greater freedom of movement and operator comfort.
- Features a large 30 litre, integral airlock that will accommodate up to 133 x 96 well plates or 252 x T25 culture flasks.
- Colour touchscreen control for ease of use and visual display of parameters such as temperature and humidity.
- Ethernet-enabled for remote access.
- Gas mixing achieved instantly via a unique, fully integrated control system - rapidly create your selected environmental conditions and minimise bench space required.
- Available with fully automatic humidification system so you can add moisture and maintain a sterile environment.
- Option of 3 different types of single sample transfer system.

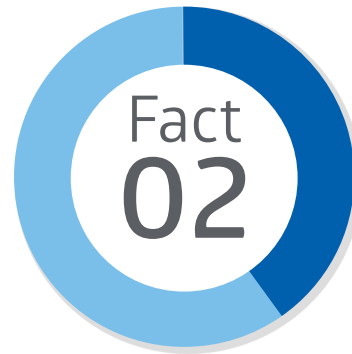


# 09 | Unique Innovations



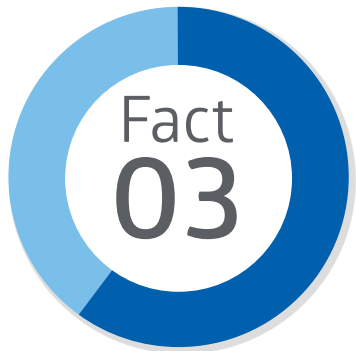
## *Oval Sleeved Ports*

Patented oval, sleeved ports allow greater freedom of movement and operator comfort. This system allows you to work gloved or bare handed.



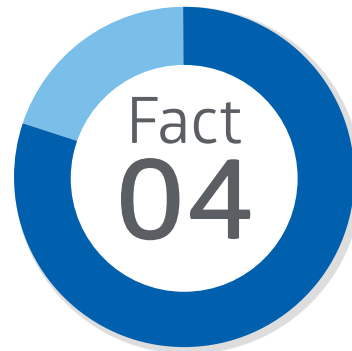
## *Colour Touchscreen*

Innovative full colour touchscreen that is ethernet-enabled for remote access. The touchscreen interface displays the status conditions of all controlled parameters and also allows the user to change operating parameters to suit specific test conditions. Alarm conditions are clearly displayed and PIN code controlled user access levels protect user adjustable parameters.



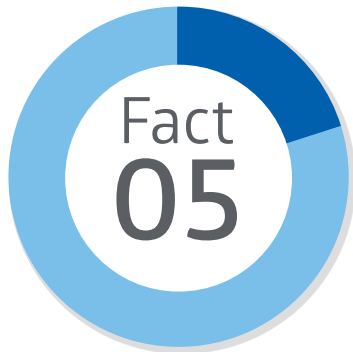
## *HEPA Filtration*

In the Whitley HEPA Filtration System all the atmosphere in the chamber passes through the filter every four seconds, quickly creating and maintaining a particle-free environment (tested down to  $0.3\mu\text{m}$  – exceeding ISO 14644 Class 3, as referenced in the Cell Tissue Culture Directive, or Class 1 of US Federal Standard 209E). Unlike some other systems, DWS integrates the filter within the workstation. Because the warm, moist atmosphere isn't pumped to an external filter, the filter does not become saturated with condensate and thus rendered ineffective.



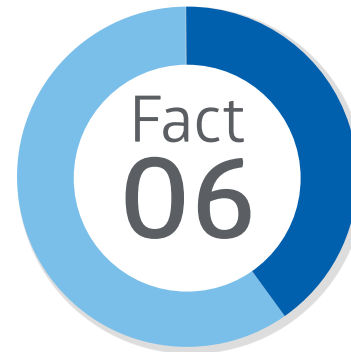
## *Automatic Humidification*

The Automatic Humidification System provides a sterile source of humidity without the need for the user to increase the humidity by adding open trays/containers of water to the workstation. The automatic humidification system does not increase the maximum level of humidity that can be achieved but will increase the humidity very quickly and does so without contaminating the atmosphere.



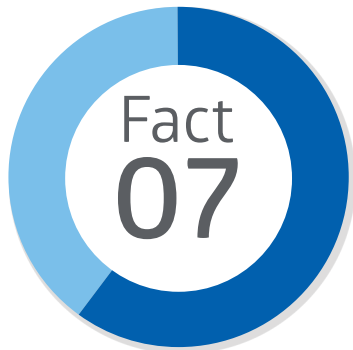
#### *Whitley Removable Front*

This feature allows for thorough cleaning and the transfer of bulk samples and equipment. With swing latches that are turned 45° - and don't need to be removed – it's very easy to attach and detach the Whitley Removable Front. There are no parts to store (or lose!) or to be overtightened.



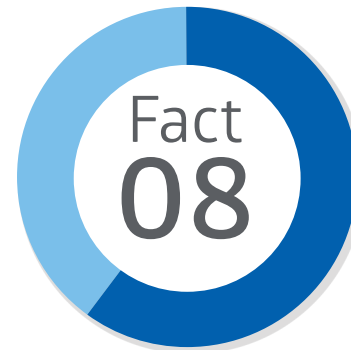
#### *Data Download/Traceability*

There is an option to purchase data logging software for all Whitley Hypoxystations. This feature allows the recording of temperature, humidity and chamber pressure conditions for traceability and reference. The information is displayed on the touch screen in graphical format. The recorded data can be downloaded in only 10 seconds via the USB interface to a memory stick and exported to our bespoke, pre-formatted spreadsheet software.



#### *Oxygen Profiling*

This option allows the user to pre-programme different oxygen levels. The user can determine how long the Hypoxystation atmosphere remains at a particular oxygen level before being automatically adjusted to higher or lower concentrations. Oxygen sensing is in real time with no delay as the sensor is inside the chamber.



#### *Internal Oxygen Sensor*

O<sub>2</sub> sensing, monitoring and control are key components of accurate atmosphere control in a hypoxic workstation. The Hypoxystation has an integrated O<sub>2</sub> sensor located in the incubation chamber, under the exact environmental conditions as your cell cultures and other samples. This allows for a precise, real-time feedback system that constantly monitors the internal atmosphere. Hypoxystation can quickly respond to any changes to ensure user settings are accurate and reproducible. Having an integrated O<sub>2</sub> sensor eliminates the need to extract a gas sample and pump it to an external or remote monitoring system for evaluation.



Features	Whitley DG250 Workstation	Whitley H35 Hypoxystation	Whitley H35 HEPA Hypoxystation	Whitley H45 Hypoxystation
Chamber Volume	214 litres	300 litres	300 litres	439 litres
Port / Airlock Capacity	10 plates per port (20)	12 litres	12 litres	12 litres
Porthole System	Manual	Manual	Manual	1 Instant Access + Manual
Gas Supplies	Pre-mixed Gas	CO <sub>2</sub> / Air / N <sub>2</sub>	CO <sub>2</sub> / Air / N <sub>2</sub>	CO <sub>2</sub> / Air / N <sub>2</sub>
Footswitch	Hardwired	Wireless	Wireless	Wireless
Auto Sleeve Gassing	○	○	○	○
Internal Mains Socket	○	○	○	○
Storage Trays	○	○	○	○
Lighting	○	●	●	●
Inspection Lamp	●	○	○	○
Single Sample Entry	○	○	○	○
O <sub>2</sub> Profiling	-	○	○	○
CO <sub>2</sub> Monitoring	-	●	●	●
Refrigeration	-	-	-	-
Data Logging	-	○	○	○
Airlock Cycle Time	15 second sample transfer via ports	60 seconds	60 seconds	60 seconds
Extra Cable Glands	○	○	○	○
HEPA Filtration	-	-	●	-
Vacuum Take-off	-	○	○	○
Automatic Dehumidifier	●	●	●	●
Automatic Humidifier	-	○	○	○
Chilled Incubation Compartment	-	○	-	○
Removable Front	Full lift off lid	○	●	●
Workstation Trolley	○	○	○	○
Remote Access	-	○	○	○
Dimensions (w/d/h)	810 / 760 / 635	1255 / 720 / 710	1255 / 810 / 710	1660 / 720 / 710
Weight (lbs/kg)	141 / 64	231 / 105	264.5/ 120	295 / 134
KEY:      ● Fitted as standard      ○ Option available      - Not applicable				

Whitley H45 HEPA Hypoxystation	Whitley H135 Hypoxystation	Whitley i2 Instrument Workstation	Whitley H85 Hypoxystation	Features
439 litres	600 litres	600 litres	295 litres	Chamber Volume
12 litres	12 litres	12 litres	30 litres	Port / Airlock Capacity
1 Instant Access + Manual	Manual	Manual	Manual	Porthole System
CO <sub>2</sub> / Air / N <sub>2</sub>	CO <sub>2</sub> / Air / N <sub>2</sub>	Air / N <sub>2</sub>	CO <sub>2</sub> / Air / N <sub>2</sub>	Gas Supplies
Wireless	Wireless	Wireless	Wireless	Footswitch
○	○	○	○	Auto Sleeve Gassing
○	●	●	○	Internal Mains Socket
○	○	-	-	Storage Trays
●	●	●	●	Lighting
○	○	○	-	Inspection Lamp
○	○	○	○	Single Sample Entry
○	○	-	○	O <sub>2</sub> Profiling
●	●	-	●	CO <sub>2</sub> Monitoring
-	-	-	○	Refrigeration
○	○	○	○	Data Logging
60 seconds	60 seconds	60 seconds	3.5 minutes	Airlock Cycle Time
○	○	○	○	Extra Cable Glands
●	○	-	-	HEPA Filtration
○	○	○	○	Vacuum Take-off
●	●	-	●	Automatic Dehumidifier
○	○	-	-	Automatic Humidifier
-	○	-	-	Chilled Incubation Compartment
●	●	●	-	Removable Front
○	○	○	○	Workstation Trolley
○	○	○	○	Remote Access
1660 / 810 / 710	1452 / 1056 / 993	1702 / 825 / 1863 (including trolley)	1570 / 760 / 840	Dimensions (w/d/h)
386 / 175	386 / 175	286 / 130	330 / 150	Weight (lbs/kg)

# 13 | What Can We Do For You?



## SERVICE AND MAINTENANCE

### *Comprehensive service plans*

We offer UK customers comprehensive maintenance and repair contracts on a variety of laboratory equipment from many different manufacturers.

We are the only company able to take advantage of training from our in-house colleagues who design and manufacture Whitley products – and, of course, have their day-to-day support.

We also ensure all our engineers have been trained by the manufacturers of any equipment they service.

- Engineer coverage across the UK
- Fast response time
- Stock of parts carried to ensure a first time fix



## TEMPERATURE MAPPING

### *On-going compliance*

In today's increasingly regulated environment, the need to demonstrate on-going compliance with quality and safety standards is part of laboratory life.

DWS is UKAS accredited to provide temperature mapping of Whitley Workstations, other hypoxic chambers, incubators, ovens, fridges or freezers using up to 12 thermocouples. This is useful when you need to identify any temperature gradients that may be present and need to be avoided when carrying out particularly sensitive incubation tasks.

Our on-site service means the work can be carried out at your convenience with prompt supply of certification. If you have a DWS service contract, you can arrange for your temperature mapping to be done at the same time as a routine service or repair work for the most cost-effective price.



## WORKSTATION POSTER GRANT

### *You could be entitled to £250*

If you have used a Whitley Hypoxystation in your work and have mentioned it on your poster or published paper, let us know and you could be entitled to a grant of £250.

We have a series of travel grants available to those who mention the use of the Hypoxystation in a poster they wish to present or on a published paper. All we ask in return is a copy of your poster/paper so we can use it to help promote the Hypoxystation to others. If we have a trade stand at the event where you will be presenting your poster, we can provide copies to everyone who visits our stand.





## IN-HOUSE LABORATORY

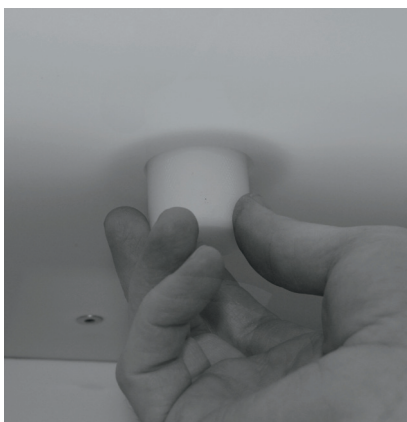
### *Scientific support services*

It's not every laboratory equipment manufacturer that has its own in-house laboratory with experience in tissue and cell culture, food, water, environmental, pharmaceutical and clinical work. As well as having developed a great deal of experience culturing in hypoxic conditions, the team of DWS scientists have a key role in new product development.

They are also on hand to help customers with the best practical, productive ways of using products supplied by DWS.



To support the design, manufacture and supply of Whitley Hypoxystations, we have a range of complementary services:



## Don Whitley Scientific

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