

Detailed Specification

Whitley H85 Hypoxystation

Statements in **red** in the Detailed Specification contain features and/or benefits which we believe are unique to Don Whitley Scientific.

1. Introduction

The Whitley range of modified atmosphere workstations combines advanced ergonomics, contemporary aesthetics and superb atmospheric control. The Hypoxystation has been developed for the study of cells under hypoxic and anoxic atmospheric conditions. Nitrogen, carbon dioxide and compressed air can be combined to provide a specific atmosphere when the unit is operated in hypoxic mode.

The component gases can be adjusted in the following ranges:

O₂ - 0-20% in increments of 0.1%;

CO₂ - 0-15% in increments of 0.1%;

N₂ - Balance.

2. Capacity

The workstation has a 30 litre airlock and a 295 litre main chamber.

3. Construction Material

All acrylic structures incorporated within Whitley Workstations are produced by specialised acrylic fabricators employing skilled craftsman with many years of relevant experience. The fabricated acrylic chamber at the heart of every Whitley Workstation is annealed (heat treated) at least twice during manufacture. The chamber is manufactured from a combination of 6mm and 10mm acrylic for structural stiffness and optical clarity. The annealing process relieves the stresses induced in the structure as a natural consequence of machining, forming and polishing acrylic. All annealing is carried out in strict accordance with procedures laid down by the supplier/manufacturer of the acrylic sheet in a UKAS-calibrated annealing oven which is temperature mapped annually. These tests are traceable to national standards. The individual temperature process profile for the final annealing cycle of every completed chamber is recorded, printed and supplied to us with the chamber by our acrylic fabricator. These results, together with other production records, are filed in our archives for a minimum of five years.

Whitley Workstations are provided with a lifetime guarantee against faulty design or workmanship.

Other workstation components are manufactured from a variety of materials including mild steel, aluminium, stainless steel, brass and polyurethane. Each material and industrial process has been carefully selected according to the function of the component.

4. Size

Physical dimensions: 1570mm x 840mm x 760mm (L x H x D). Incubation area: 840mm x 440mm x 330mm (L x H x D).

A 10mm thick removable shelf divides this space into two areas, the lower of which is 220mm high, the upper being 210mm high. Working area: The working area is 840mm wide x 160mm deep with a height of 330mm at the front of the chamber, rising to 440mm immediately in front of the incubation area.

5. Gas Requirements

Gas inlets for the following gases are located at the back of the workstation: compressed air, carbon dioxide from a vapour withdrawal cylinder and oxygen free nitrogen.

Input pressures for all gases are:

Minimum 4 bar (60psi);

Maximum 6 bar (90 psi).

The possible percentage concentration of carbon dioxide is a function of the percentage of oxygen selected. Carbon dioxide (0% - 15%) and oxygen (0% - 20%) can be selected. There must be a minimum of 80% nitrogen in the system and the balance can be split between O₂ and CO₂.

When there is a requirement to operate the Hypoxystation anoxically, connect an anaerobic gas mix cylinder (10% H₂, 5% CO₂ and 85% N₂) to the workstation via the supplied adaptor and install palladium catalyst. In the presence of the catalyst, any oxygen present in the workstation atmosphere will be removed by combining with hydrogen to produce water.

6. Gas Alarms and Control System

All alarms are displayed clearly on the touch screen panel.

7. System Operation:

7.1 Humidity Control

A fully automatic de-humidification system is fitted. It does not require any operator intervention. A pump controlled by a timer opens regularly for a set duration, allowing water to pass to an external reservoir and evaporate. This system ensures effective removal of any excess moisture in the chamber. The humidity level is controlled by a humidity sensor located in

7.2 Temperature Control

The operating temperature of the workstation can be set between 5°C above ambient and 45°C by adjusting the set point value. Detailed instructions are contained within the User Manual, which is supplied to you at the time of installation. Both the working and storage areas of the chamber are temperature controlled with an impressively low temperature gradient throughout. This allows the full internal chamber volume to be used for incubation if desired. A separate, small internal incubator with a maximum operating temperature of 60°C is available as an optional extra.

7.3 Sample Manipulation

All Don Whitley Scientific workstations are designed to provide incubation areas and generous working spaces. The advanced ergonomic design ensures that good laboratory practice can be carried out with maximum user comfort.

8. Integral Airlock

The 30 litre airlock is fitted with an automatic internal door and provides an easy and rapid method for the transfer of up to 133 x 96 well plates or 252 x T25 culture flasks from the laboratory to the workstation. The dimensions of the airlock are 295mm wide x 295mm deep x 350mm high. The maximum cuboid that can be introduced into the chamber via the airlock is 295mm x 295mm x 285mm.

With a full length shelf in place in the workstation chamber: A tray measuring 295 mm x 295 mm can be transferred into the chamber. There is also still room for a small amount of loops, swabs etc. Without the full length shelf in place in the workstation chamber: An object measuring up to 295 mm long x 295 mm deep x 285 mm high can be passed through the airlock. Tall Items: The airlock maximum internal height is 350 mm, permitting flasks and other tall items to be transferred into the chamber (even though the inner door opening is only 290 mm high) by tilting tall vessels slightly as they pass through the opening. We apply a small tolerance to these figures so it is possible that a particular item can be transferred even if it is slightly larger than the sizes quoted.

The airlock cycle takes only 5 minutes.

9. Touchscreen Control

Operating conditions are configured and maintained by an intelligent, programmable logic controller in conjunction with an intuitive touch screen interface. The touch screen 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.

10. Porthole System

This workstation features two manually operated, oval portholes, equipped with sleeves and cuffs, which provide considerable freedom of movement and operator comfort. The atmosphere in each sleeve is removed and replaced with nitrogen.

11. PLC

Incorporating such an advanced and intelligent programmable logic controller enables reliable control and accurate, fast monitoring of the workstation conditions.

12. Oxygen Profiling with Data Logging

This option allows the user to record the data from the environmental parameters inside the workstation AND allows the user to pre-programme different oxygen levels. The user can determine how long the workstation atmosphere remains at a particular oxygen level and when to adjust to higher or lower oxygen concentrations.

13. Automatic Sleeve Gassing

This optional feature ensures cost-effective gas usage and that internal conditions are maintained throughout the entry and exit process.

14. Cable Glands

Cable glands allow cables and probes to be introduced into the chamber without compromising internal conditions. A spare, small cable gland is fitted as standard with a clamping range between 3 - 7mm in diameter. A larger cable gland (with a clamping range of 18 - 25mm in diameter with reducer) is also available. Within reason, any number of small or large cable glands can be incorporated. If additional cable glands are required, they must be discussed and specified at the time of order.

15. Single Sample Entry System

This workstation comes with a blanking plate in the shell so that a single sample transfer system can be added at a later date if required. Three types of single sample transfer system are available for this workstation: The standard system as described above: A letterbox with long support tray for larger items; A letterbox that will fold away for an unobstructed working

16. Refrigeration

The optional refrigeration unit is designed to maintain a lower than normal temperature within the incubation and working area. If using a DWS trolley, an extension will be required to accommodate this option. The standard refrigeration unit is designed to operate at $8 \pm 1.5^{\circ}\text{C}$ when located in an ambient temperature of $21 \pm 2^{\circ}\text{C}$. Other set temperatures can be achieved by discussion with our product development staff.

17. Single Point Temperature Calibration

This is essential when a laboratory must demonstrate that temperature performance could directly or indirectly affect results. It provides independent, UKAS-accredited testing and supporting certification. It also confirms, through measurements taken from a single position within the workstation incubation area, using a calibrated temperature probe traceable to national standards, that the workstation temperature is controlled and displayed within specified tolerances. Factory-based or on-site test.

18. Multi-Point Temperature Mapping

This is essential when a laboratory must demonstrate that temperature performance could directly or indirectly affect results. It provides independent, UKAS-accredited testing and supporting certification. The process comprises calibration of the workstation temperature sensor and a comprehensive temperature profile of the entire working and incubation area. Data is collected from up to 12 sensors, traceable to national standards, positioned throughout the workstation chamber. This is preferably a factory-based test but it can be performed on-site if necessary.

19. Spotlight Option

The Whitley LED Spotlight option provides directional lighting to assist specimen examination. It is mounted on a small pod on the left hand side of the chamber. The on/off switch is also located on this pod.

20. Customer Specific

Whatever your application, we can tailor your workstation to your requirements. For example, if you want to be able to use electrical equipment inside the chamber, you could include the option of an internal double electrical socket. If you require under shelf storage trays, we can supply 1 or 2 units and if you want to be able to quickly introduce individual Petri dishes, tissue culture flasks or multi-well plates, you could specify a 'Letterbox'. We are always pleased to discuss your requirements.