Biora
Grow Chambers

Walk-in, Reach-in, and Custom Chambers

Controlled environments designed to sustain precise conditions, as well as maximise production capabilities, product quality and security.

mineARC SYSTEMS | biora

Fully customisable Grow Chamber and Environmental Control Room solutions.

mineARC SYSTEMS

Company Profile

MineARC Systems have been at the forefront of controlled environment design, development and manufacture for over 20 years; striving to improve the health and safety standards within the mining, tunnelling, chemical processing, disaster relief and extreme weather industries worldwide. MineARC Systems' industry leading refuge chambers and safe havens are present in over 60 countries and have been used in multiple real-life emergencies to keep occupants safe.

MineARC's key focus on quality control and product development has meant that all MineARC Refuge Chambers and Safe Havens comply with the highest international regulations and recognised 'world's best practice' industry guidelines.

In-house research and development with our team of engineers, electrical designers, technical experts, as well as production and service technicians has allowed us to branch out into multiple industries over the years. Our knowledge and proficiencies have now given us the opportunity to gain recognition beyond our refuge chambers and safe havens and expand into the science and research industries. Our Biora Grow Chamber is a perfect solution for controlled environment agriculture and climatic stability testing.

As advocates of innovation, our dedication to ongoing research and development is driven by our emphasis on client satisfaction. MineARC listens to and understands the needs of our clients, whilst never compromising on safety and quality. Placing a high importance on building strong relationships with our clients allows us to develop unique and customised solutions. This approach enables us to improve research and growth facilities, reduce costs and simplify operations.

MineARC's manufacturing facilities in the United States, Australia and Africa, as well as offices in Europe, China, Mexico and Chile allow us to provide local technical support to all clients.

www.minearc.com

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TRC ISO 9001:2015 Quality Management Systems

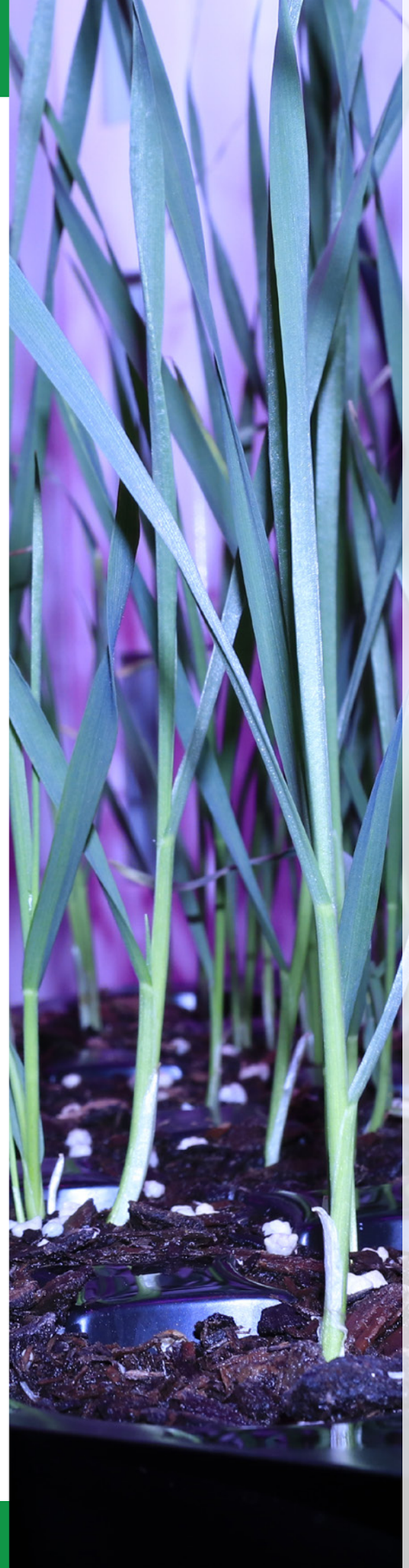
Australian C-Tick Standards: AS4100-1998, AS3570.1-18, AS2208, AS3000, AS1716-15

Canadian Standards Association (CSA)

United States National Electrical Code (NEC) 2013/14

Quality Management System (QMS)

European CE Certified to Machinery Norms



MineARC's Biora offers multi-functional Walk-In and Reach-In Grow Chambers and Environmental Control Rooms for all plant science and agricultural biotechnology applications.

Enjoy the benefits of innovative functionality, versatility and the replication of any environmental condition within a secure and robust shell.

MineARC offers a consultative design process enabling clients to have control over all aspects of the design process.

Proven accurate monitoring systems for the efficient production of controlled environment agriculture.

For use in the research of:

- Plant Growth
- Germination
- Tissue Culture
- Crop Sciences & Diseases
- Algae
- Arabidopsis
- Entomology
- Seeds Storage and Drying
- Medical Cannabis

- ✓ Precise environmental control based on required specifications
- ✓ Remote monitoring and inter-chamber connectivity
- ✓ Purpose-engineered gas monitoring and atmosphere control
- ✓ Dedicated Engineering team to provide customised configurations and internal features
- ✓ End-to-end service with local after sales support and maintenance schedules
- ✓ ISO 9001:2015 certified company

Biora
Walk-in Chambers

High quality, reliable, walk-in controlled environments for indoor and outdoor use.

Biora Walk-In Chambers

Customisable. Secure. Robust. Modular.

Biora Walk-in Chambers provide the control and repeatability needed to efficiently sustain precise conditions, maximise production capabilities, product quality and security, whilst conserving water and energy use.

Building on MineARC's successful capabilities in creating controlled environments for industrial safety, Biora's componentry allows for the development, refinement and repetition of specific growth and testing conditions. Cooperating with clients and ensuring we understand their requirements and specifications guarantees Biora Walk-in Chambers provide maximum flexibility to meet changing research requirements. Clients benefit from high involvement in every aspect of the design and manufacture process, enabling us to provide the solution to best suit their needs.

All components are designed, manufactured, installed, commissioned and serviced by MineARC Systems, including:

- Portable and insitu chambers
- Temperature & humidity control
- Lighting
- Carbon dioxide control
- Irrigation
- Security & control systems

TEMPERATURE CONTROL RANGE (COOLING)	67-88˚F / +19-30˚C
TEMPERATURE CONTROL RANGE (HEATING)	63-83˚F / +17-28˚C
HUMIDITY RANGE	<85%
SHELVES	4 x 3ft / 1.2 x 0.9m
GROW AREA PER SHELF	12ft² / 1.1m²
GROW HEIGHT	20" / 0.51m
LIGHT TYPE	LED or Fluorescent
LIGHT INTENSITY	LED: 150-1100 umol/m2s Fluorescent: 150-300 umol/m2s
AIRFLOW	0-10ACH
ELECTRICAL CONNECTION	220V 50/60Hz

Biora Walk-In Chambers - Configurations

Portable Grow Chambers

Biora Portable Grow Chambers are pre-built at one of MineARC's three manufacturing locations, then shipped to site ready for immediate use.

Ideal for both outdoor and indoor locations (with enough access), the fully portable design eliminates the hassle of onsite installation and certification.

The structure is framed with fully welded 6.4mm (1/4") steel members that are painted in an expoxy primer and two component industrial top coat. Transportable via integrated forklift slots or ISO container corner castings; each chamber has undergone inhouse analysis to ensure compliance with local building codes.

Custom dimensions are available on request.

Model	External Dimensions - m [ft] (H x W x L)	Internal Dimensions - m [ft] (H x W x L)	Weight - kg [lbs]	Shelves	Grow Area - m² [ft²]
BI-WI-PB-10-12-20	3 x 3.7 x 6.1 [10 x 12 x 20]	2.8 x 3.3 x 5 [9.2 x 10.9 x 16.3]	4,600 [10,000]	18	20.1 [216]
BI-WI-PB-10-12-28	3 x 3.7 x 8.5 [10 x 12 x 28]	2.8 x 3.3 x 7.4 [9.2 x 10.9 x 24.3]	6,200 [13,600]	30	33.4 [360]
BI-WI-PB-10-12-32	3 x 3.7 x 9.8 [10 x 12 x 32]	2.8 x 3.3 x 8.6 [9.2 x 10.9 x 28.3]	7,000 [15,400]	36	40.1 [432]
BI-WI-PB-10-12-40	3 x 3.7 x 12.2 [10 x 12 x 40]	2.8 x 3.3 x 11.1 [9.2 x 10.9 x 36.3]	8,200 [18,000]	48	53.5 [576]

Modular Grow Chambers

Biora Modular Grow Chambers are shipped and constructed onsite by a team of trained MineARC Technicians.

Suited for indoor locations where access is limited, they are modular in design; allowing for multiple rooms and sizes within a single facility.

The structure is framed with 3mm (11-gauge) steel, powder coated and bolted together with stainless steel hardware.

Custom dimensions are available on request.

Model	External Dimensions - m [ft] (H x W x L)	Internal Dimensions - m [ft] (H x W x L)	Weight - kg [lbs]	Shelves	Grow Area - m² [ft²]
BI-WI-BO-10-10-15	3 x 3 x 4.6 [10 x 10 x 15]	2.8 x 2.9 x 4.5 [9.2 x 9.7 x 14.7]	3,100 [6,625]	18	20.1 [216]
BI-WI-BO-10-10-20	3 x 3 x 6.1 [10 x 10 x 20]	2.8 x 2.9 x 6.0 [9.2 x 9.7 x 19.7]	3,900 [8,500]	24	26.8 [288]
BI-WI-BO-10-10-28	3 x 3 x 8.5 [10 x 10 x 28]	2.8 x 2.9 x 8.4 [9.2 x 9.7 x 27.7]	5,300 [11,500]	36	40.1 [432]
BI-WI-BO-10-10-32	3 x 3 x 9.8 [10 x 10 x 32]	2.8 x 2.9 x 9.7 [9.2 x 9.7 x 31.7]	5,900 [13,000]	42	46.8 [504]
BI-WI-BO-10-10-40	3 x 3 x 12.2 [10 x 10 x 40]	2.8 x 2.9 x 12.1 [9.2 x 9.7 x 39.7]	6,900 [15,000]	54	60.2 [648]

Biora Walk-In Chambers - Major Features

HMI Control

MineARC's proprietary HMI control software allows visual control and display for temperature, humidity, lighting and airflow. Integrated audible alarms and fault logging is included as standard.

Shelving

Standard shelving is highly resistant stainless steel; designed to accommodate lighting from underneath the shelf. They are easily adjustable to variable heights for different stages of plant growth.

To accommodate rolling carts, ceiling mounted lighting banks are available with either a manual or electric pulley system to vary height.

Doors

Standard doors are outward opening swing doors; insulated and weather stripped with an observation window and key lock.

Sliding door options are available for locations where the swing radius will impede space.

Air Conditioning

Biora Walk-in Chambers are fitted with high quality split system ducted air conditioners. Inverter-driven DC motors ensure the units are extremely energy efficient; automatically switching between heating and cooling to accurately maintain the ambient temperature and humidity. Advanced heat pump technology permits use in outdoor climates down to -25°C (-13°F).

Optional individual ducting and zone control is available for different grow areas; ideal for eliminating micro-climates or enabling different grow areas to maintain varying temperature and airflow gradients.

Alternate refrigeration methods such as water cooled with hot gas bypass or centrally controlled are available depending on customer requirements.

Flooring

Flooring consists of aluminum tread plate with under-floor drainage. Under-floor radiant heating is available as an option for cold climates.

Airflow

Uniform airflow is introduced to the chamber through variable speed fans. The air changes can be reduced or halted to support CO_2 enrichment practices with minimal waste. A replaceable HEPA filter ensures minimal cross contamination (<1%) between entering and leaving air streams.

For extreme temperature climates, an optional energy recovery system will ensure fresh air is appropriately cooled or heated before being injected into the chamber.

Lighting

Standard lighting consists of dimmable LED or fluorescent lighting ideally suited for plant growth. Lights of varying spectrums and intensities are available as an option for specific vegetation and flowering applications.

Each bank of lights can have its own on/off timer, controllable via the HMI.

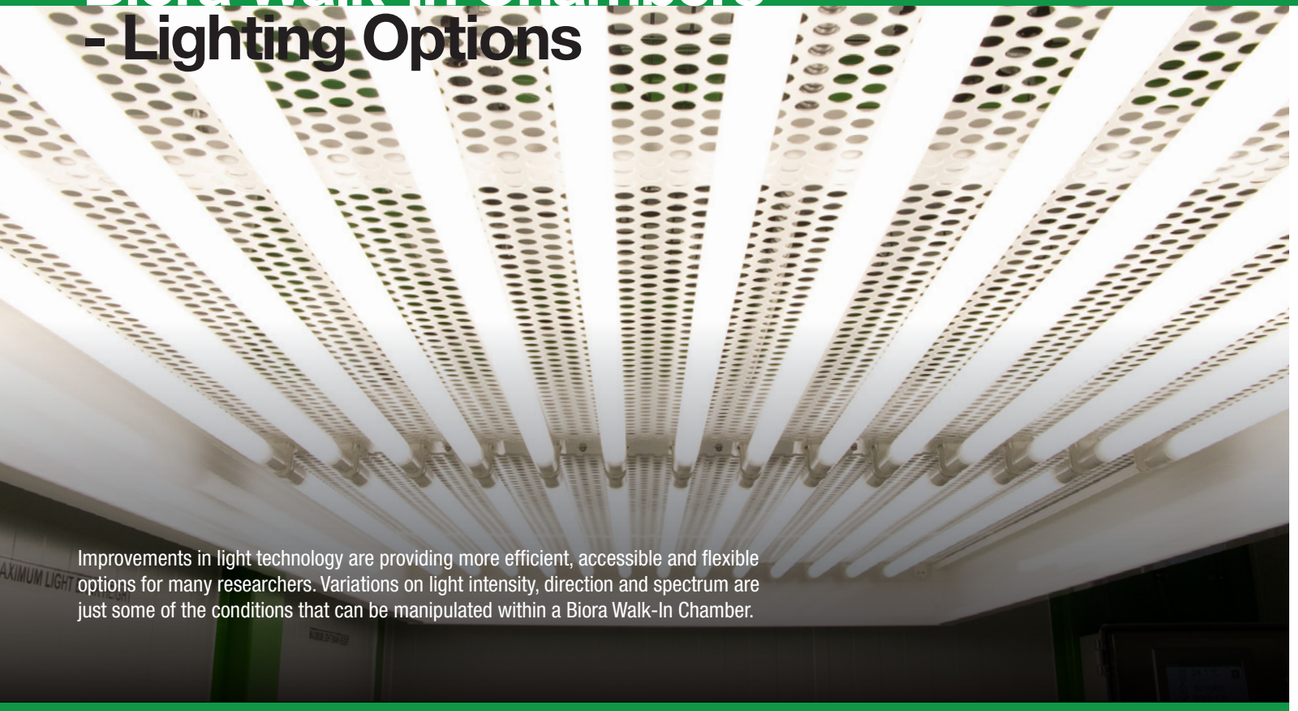
Insulation

All surfaces of the Biora Walk-in Chamber are constructed of insulated metal panels, composed of a polyurethane foam core. With a high thermal insulation capacity and standard R-Value of 16 for built onsite and R-22 for pre-built chambers; the panels meet the most demanding temperature control requirements.

Panels are available in additional thicknesses up to an R-value of 44 for extreme climates.

With excellent aesthetics the panels are easily washable and resistant to chemical spills and corrosion.

Biora Walk-In Chambers - Lighting Options



Improvements in light technology are providing more efficient, accessible and flexible options for many researchers. Variations on light intensity, direction and spectrum are just some of the conditions that can be manipulated within a Biora Walk-In Chamber.

Common Types of Lights

High-Pressure Sodium (HPS)
The High-Pressure Sodium (HPS) light is a specific, more efficient type of gas discharge light. HPS lights are better suited to promote flowering and fruiting and are most commonly used in broad coverage areas, such as greenhouses and shelters with access to natural light.

Fluorescent Lighting
Historically, the most common type of light for indoor plant growth, fluorescent lamps have been surpassed by LED lighting. Fluorescent lights are best used to germinate growth indoors and propagation situations where low light levels are required.

LED Lighting (Light Emitting Diodes)
LEDs provide the most considerable spectral variation and can be mixed to create the required conditions. LED Lighting is fast becoming the single choice for many researchers, due to their longevity, flexibility and energy efficiency.

Determining the correct spectral mix can be one of the main challenges when it comes to maintaining a fit-for-purpose controlled environment.

MineARC's engineers and lighting partners can advise clients on the best lighting solution for their application.

Biora Walk-In Chambers - Lighting Options

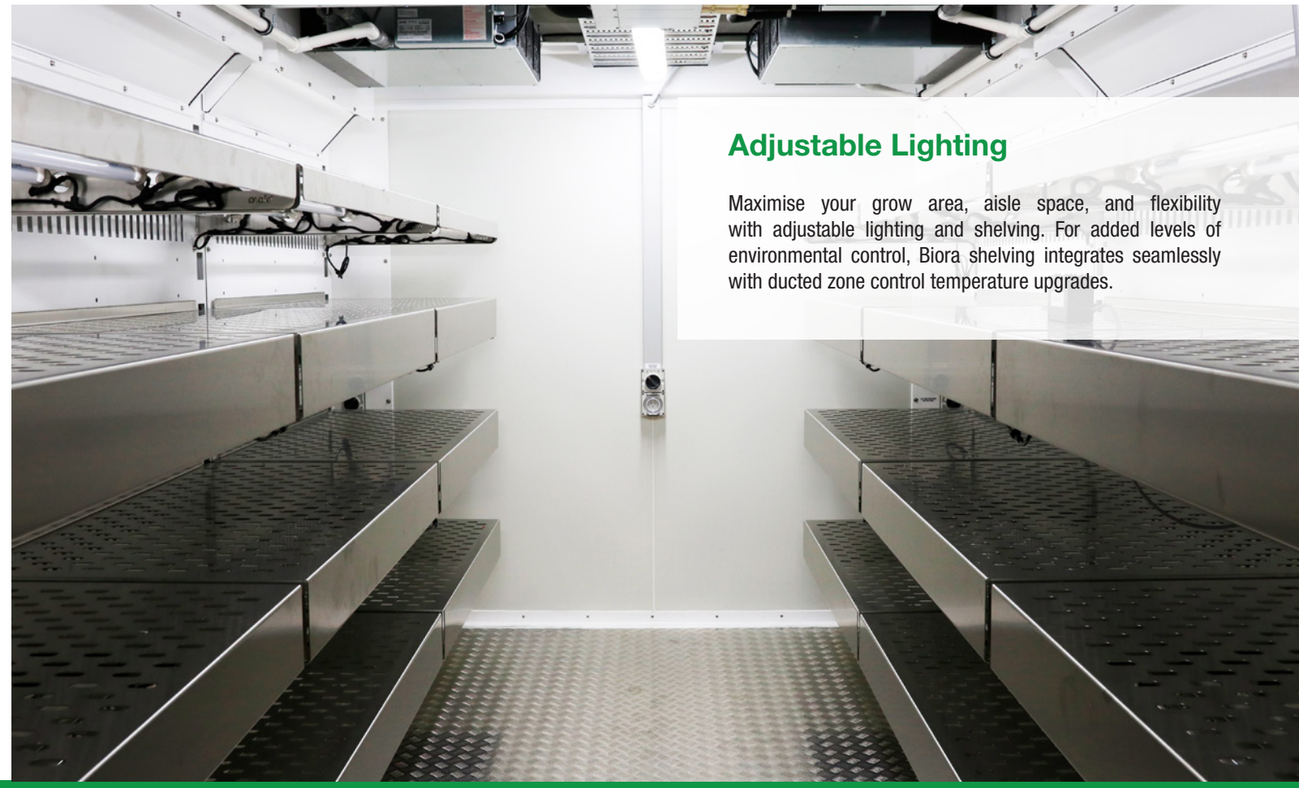
Lighting Options

Regardless of the chamber's size or configuration, MineARC can build a customised lighting solution that will meet client specifications and spectrum requirements.

Our engineers can provide varying levels of lighting control; all accessible from the chamber's HMI and remote control system.

MineARC offers a range of LED, HPS and fluorescent lights, of varying intensities; providing complete flexibility for any project.

- ✓ **Custom lighting design based on requirements, including LED, HPS and fluorescent**
- ✓ **Control over canopy, intensity and spectrum for day time and seasonal replication**
- ✓ **Single and multi-tier opportunities**
- ✓ **Optional high-quality built-in light measurement equipment for refinement of testing conditions**



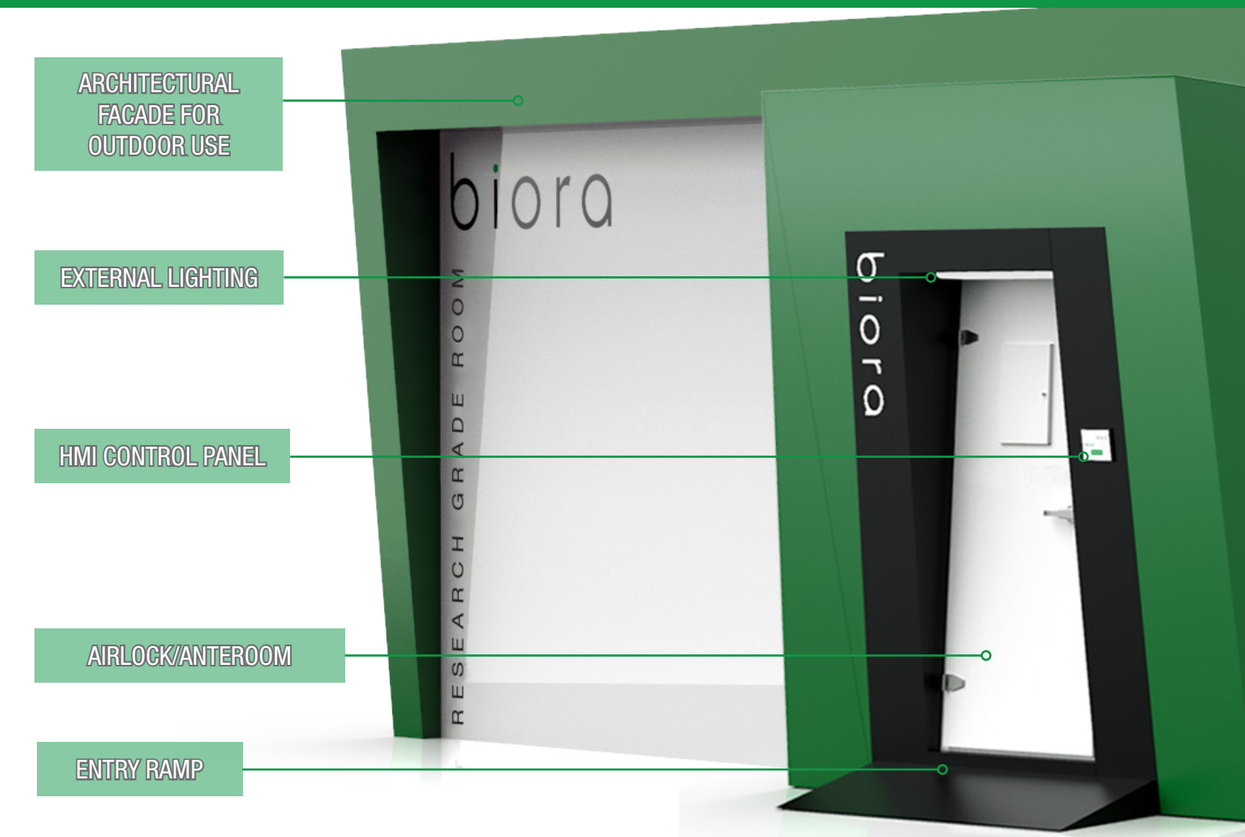
Adjustable Lighting

Maximise your grow area, aisle space, and flexibility with adjustable lighting and shelving. For added levels of environmental control, Biora shelving integrates seamlessly with ducted zone control temperature upgrades.

Biora Walk-In Chambers - Research Grade Options

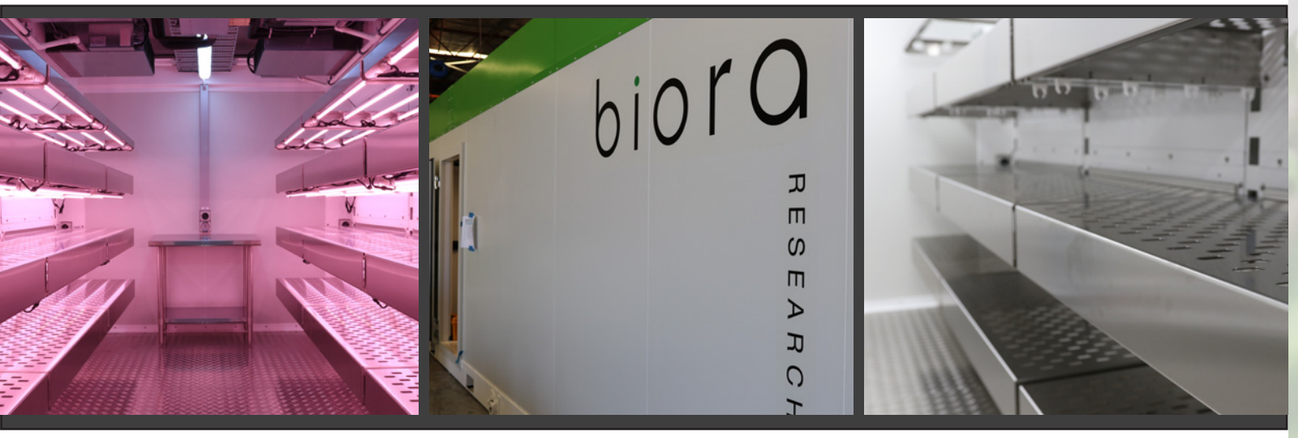
Biora Walk-In Chambers can be engineered to cater specifically to science and research applications.

Research Grade Chambers are customised during the design and manufacturing process to suit client requirements, industry recommended standards and best practice.



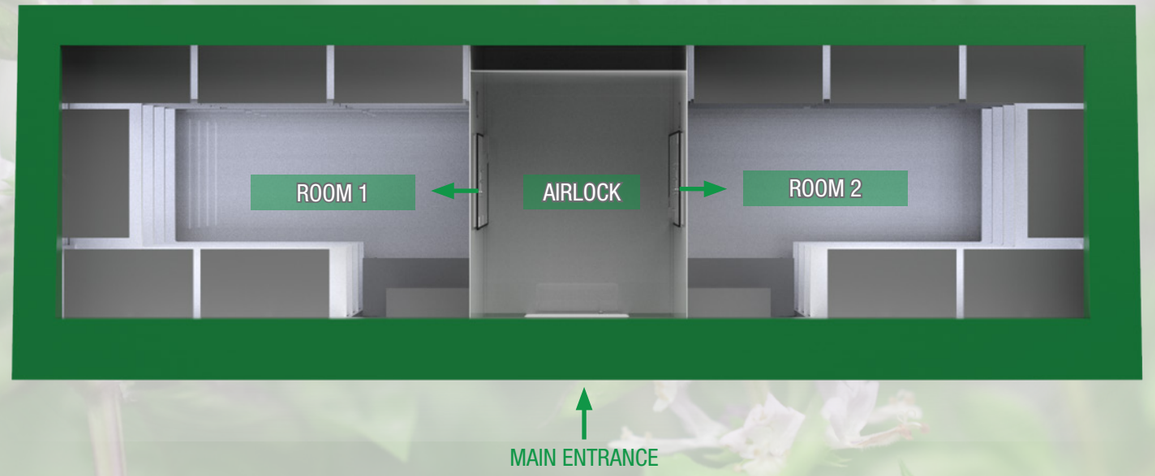
Available Options

- ✓ Airlock/anteroom options
- ✓ Exterior architectural facade
- ✓ Customizeable HMI control system and programming
- ✓ Automated irrigation and fertilization
- ✓ CO_2 monitoring and regulation
- ✓ Cold temperature enviornmental conditions
- ✓ Variable spectrum lighting
- ✓ PPC-2 and PPC-3 laboratory certification
- ✓ Security and data protection options
- ✓ Customized dimensions and modular solutions
- ✓ External lighting and entry ramp

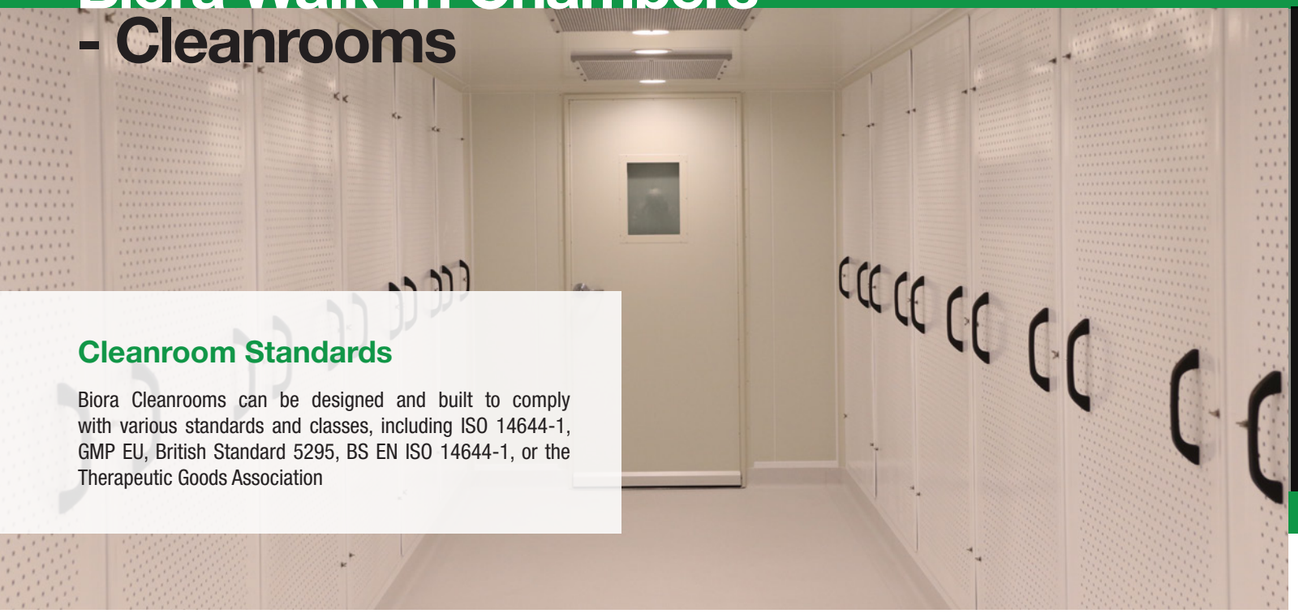


PPC-2 and PPC-3 Certifiable Solutions

MineARC can offer PPC-2 and PPC-3 certifiable laboratory for working with plant pests. This can include a pressurized airlock designed to protect the internal environment upon entry, removing the risk of contamination. Alternatively, passive anterooms are also available, allowing a multi-room configuration with individual environmental control.



Biora Walk-In Chambers - Cleanrooms



Cleanroom Standards

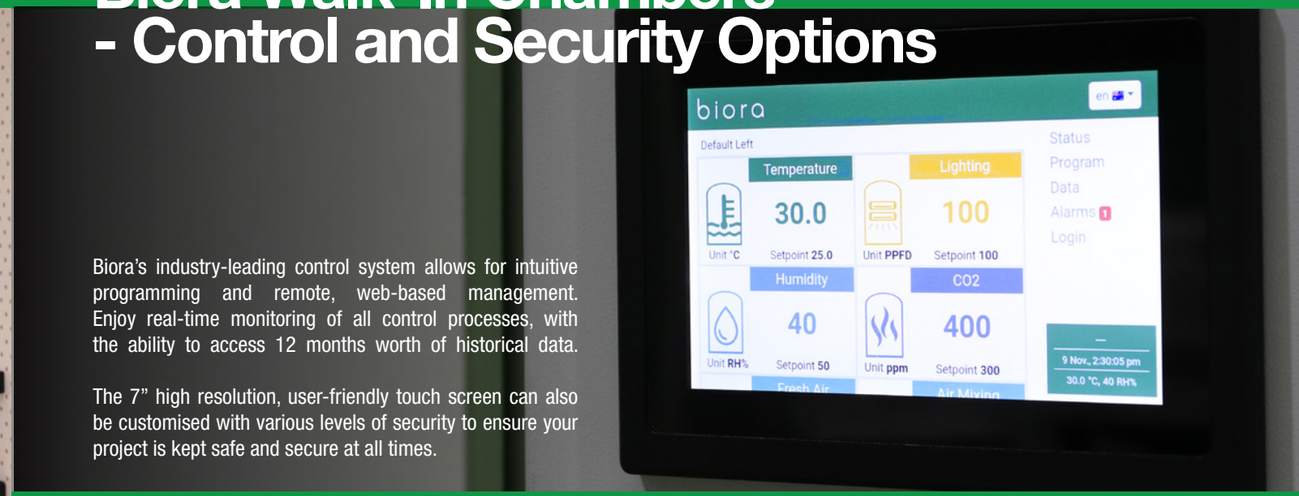
Biora Cleanrooms can be designed and built to comply with various standards and classes, including ISO 14644-1, GMP EU, British Standard 5295, BS EN ISO 14644-1, or the Therapeutic Goods Association

Cleanrooms by Biora offer portable or modular solutions to any application that requires a high level of environmental control, including manufacturing, scientific research, pharmaceutical and medical.

Biora Cleanrooms (also known as clean rooms or clean spaces) are engineered and manufactured to meet your unique conditions and required standard. With a range of established sizes and made-to-order designs to fit your application and configurations needs.

- ✓ Modular and Portable options that allow expansion over time
- ✓ Multi-room or zone options based on requirements
- ✓ Specialised temperature and humidity control
- ✓ Cleanroom-grade insulated external panelling
- ✓ Clean-room grade internal panelling, designed to withstand cleaning chemicals and agents
- ✓ 99.99% HEPA filters
- ✓ Heavy-duty, bio-security, anti-static vinyl flooring
- ✓ Concealed ducting and electrical within ceiling - accessible via external panels
- ✓ Coved joints and right-angle corners to prevent settling of dust
- ✓ Drop seal on doors, with a positively pressurised interior; preventing contamination ingress
- ✓ Rugged external structure, allowing manoeuvrability and placement outdoors

Biora Walk-In Chambers - Control and Security Options



Biora's industry-leading control system allows for intuitive programming and remote, web-based management. Enjoy real-time monitoring of all control processes, with the ability to access 12 months worth of historical data.

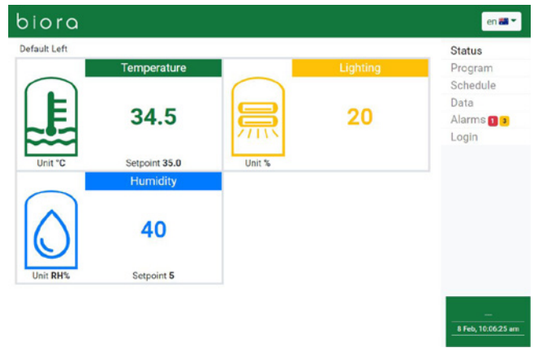
The 7" high resolution, user-friendly touch screen can also be customised with various levels of security to ensure your project is kept safe and secure at all times.

- ✓ Web-based software with both local and remote access
- ✓ Real-time monitoring of all control processes
- ✓ 12 months of historical data accessible
- ✓ Limitless customisable programs
- ✓ Data export and import options
- ✓ Push notifications based on custom alert settings
- ✓ Data protection and security options
- ✓ Customised HMI options and local engineering support

Chamber HMI Control

In addition to it's remote capabilities, Biora's Control System can also be accessed by a user-friendly touch-screen HMI Panel, located on the face or inside of each Biora Chamber.

Chamber status, historical data, alarms and programming can all be accessed and controlled via the HMI.



Remote Monitoring & Control

Biora's integrated control system enables real-time remote monitoring and control, providing confidence that your Biora Chambers are operating efficiently and effectively at all times.

The system provides web-based access to all chambers, sending alarms and push notifications (email and text message) via Ethernet and/or WiFi.

The system's home page features a summary of your entire Biora fleet, with the ability to drill down to the status and historical data of each chamber. Set, schedule and adapt programs from afar, without the need to physically visit your chamber.

Security

The Biora Control System provides the added advantage of security within the grow chamber, with an internal IP camera; accessible remotely.

A number of optional security access solutions are available to protect your investment including:

- Electric smart key lockable door with PIN code or swipe access
- External IP cameras installed for both security and remote chamber monitoring
- Internal temperature, humidity and pressure sensors.

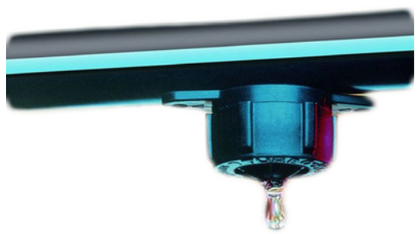
Biora Walk-In Chambers - Control Options

Carbon Dioxide and Other Gases

The monitoring and control of oxygen (O_2), carbon dioxide (CO_2) and nitrogen (N_2) is an optional feature of all Biora Walk-In Chambers.

For rapid CO_2 removal, MineARC scrubbing technology can be utilized to reduce levels within the system to below 250ppm (0.025%). Alternatively, CO_2 enrichment can be included within the chamber.

Handheld gas monitors are also available, providing a portable safety solution for individuals when entering a chamber.



Irrigation and Fertilisation

Automating irrigation improves productivity and plant quality through uniformity. MineARC's drip or ebb flow system can be connected into the HMI, allowing different automated irrigation options based on time and light intensity. Different grow areas can be set with different irrigation rates and frequency.

Biora Stand Alone Scrubber

The Biora Stand Alone Scrubber is a compact air regenerative system that 'scrubs' carbon dioxide (CO_2) from the air within enclosed spaces; allowing for complete control of CO_2 levels for research applications.

Compact in size, the unit stores for extended periods, and is easy to operate. The addition of the system permits an enclosed space that is ventilated from the outside to be converted to a fully isolated, controlled environment.

Biora Walk-In Chambers - Eye Protection

LED Eyewear Range

Agent 939 LEDFx

The world's first LEDfx lenses designed for full spectrum LED scenarios; blocking significant infrared heat energy.

- Polycarbonate, lightweight lens
- Large temple arm for peripheral protection
- Recessed rubber nose pad
- Flexible TR90 frame

Cultivator LED+

Providing great value and exceptional colour balancing for LED lighting with proprietary LED+ lenses.

- Polycarbonate lens, 100% UV protection
- Flash Silver exterior coating
- Asymmetrical lenses to eliminate distortion
- Rubber nose pad

Operator LED+

The world's first optics optimised for the magenta hue of LED environments, manufactured to exacting standards.

- Polycarbonate lens, 100% UV protection
- Flash Silver lens coating also allows for outdoor use
- Italian made, lightweight TR90 frame

Aviator Clip-On LED

Change the way you see your plants and grow room using your own prescription glasses.

- Polycarbonate lens, 100% UV protection
- Spring-loaded, rubber coated metal clips
- Aviator style fits over a wide variety of large lenses

HPS Eyewear Range

Evolution HPS+

German mineral glass HPS+ lenses provide perfect colour balance for HPS lighting as well as digital display screens.

- Full UV protection and scratch resistant lens
- Anti-reflective and Flash Silver coating
- Lightweight TR90 frame
- Concealed flex-hinges for comfort

Resistance HPS+

Utilises patented lens technology providing the perfect colour in large scale grow rooms above 10,000 watts.

- Silver lens coating for brighter spaces
- German mineral glass for optimal clarity
- Lightweight TR90 frame

Aviator Clip-On HPS

Change the way you see your plants and grow room using your own prescription glasses.

- Polycarbonate lens
- Spring-loaded, rubber coated metal clips
- Aviator style fits over a wide variety of large lenses

Biora Method Seven Photo Filters

Capture 'perfect colour' photos from within any grow room with HPS and LED photo filters. Housed in anodised aluminium and compatible with any camera with a Cokin 'P' filter holder.

Biora
Reach In Chambers

**Available in a range of sizes;
from 240-1400L**

Biora Reach-In Chambers

Biora Reach-In Chambers are available in a range of sizes, from 240 - 1400L; providing complete control over environmental conditions to suit any requirement.

When compared to other Reach-In Chambers (RICs) on the market, Biora leads the charge; with a ground-breaking control system that allows for intuitive programming and remote, web-based monitoring and management. Biora RICs also offer a large range of LED lighting options, unique to the research industry; including a selection of low intensity solutions for tissue culture sampling.

- ✓ Various sizes available, from 240-1400L
- ✓ Coated steel construction with insulated doors
- ✓ HMI control system with intuitive programming
- ✓ Adaptable, multi-tier shelving
- ✓ Large range of individually adjustable LED lighting
- ✓ Horizontal air circulation options
- ✓ Temperature control
- ✓ Security options available on request
- ✓ Leasing and hire to buy options
- ✓ CO_2 monitoring and enrichment (optional)
- ✓ Remote web-based chamber monitoring and control (optional)

Biora Reach-In Chambers - Range

Biora 240L RIC

Volume: 240L
Style: Benchtop
Interior Dimensions: 700Wx570Dx620H
Exterior Dimensions: 840Wx930Dx1360H
Exterior material: Coated steel
Interior material: Stainless steel
Doors: Single, condensation free observation window
Shelving: 1 stainless steel wire tray
Max Load per Tray: 30kg

Growth Area: 0.39m² to 0.74m²
Growth Height: 290mm to 600mm
Connection: Mains cable with plug
Working Temperature (Lights On)*: 10-45°C
Humidity (Lights On): 50-85% (optional)
CO_2: Ambient to 5000ppm (optional)
Forced Air Circulation: Back to front
Communication: USB, optional LAN, Internet

Biora 600L RIC

Volume: 600L
Style: Single compartment
Interior Dimensions: 770Wx600Dx1300H
Exterior Dimensions: 870Wx970Dx1980H
Exterior Material: Coated steel
Interior Material: Stainless steel
Doors: Single, condensation free observation window
Shelving: up to 4 stainless steel wire trays
Max Load per Tray: 30kg

Growth Area: 1.41m² to 1.88m²
Growth Height: up to 300mm
Connection: Mains cable with plug
Working Temperature (Lights On)*: 15-45°C
Humidity (Lights On): 50-85% (optional)
CO_2: Ambient to 5000ppm (optional)
Forced Air Circulation: Back to front
Communication: USB, optional LAN, Internet

Biora 700L RIC

Volume: 700L
Style: 2 separate compartments
Interior Dimensions: 1350Wx740Dx700H
Exterior Dimensions: 2100Wx1110Dx2030H
Exterior Material: Coated steel
Interior Material: Stainless steel
Doors: Single, condensation free observation window
Shelving: up to 4 stainless steel wire trays
Max Load per Tray: 30kg

Growth Area: 1.0m²
Growth Height: up to 700mm
Connection: Mains cable with plug
Working Temperature (Lights On)*: 10-45°C
Humidity (Lights On): 50-85% (optional)
CO_2: Ambient to 5000ppm (optional)
Forced Air Circulation: Back to front
Communication: USB, optional LAN, Internet

Biora 800L RIC

Volume: 800L
Style: Single compartment
Interior Dimensions: 950Wx690Dx1220H
Exterior Dimensions: 1070Wx990Dx1950H
Exterior material: Coated steel
Interior material: Stainless steel
Doors: Single, condensation free observation window
Shelving: up to 4 stainless steel wire trays
Max Load per Tray: 50kg

Growth Area: 0.6m² to 1.9m²
Growth Height: 380mm to 1200mm
Connection: Mains cable with plug
Working Temperature (Lights On)*: 10-45°C
Humidity (Lights On): 50-85% (optional)
CO_2: Ambient to 5000ppm (optional)
Forced Air Circulation: Back to front
Communication: USB, optional LAN, Internet

Biora Reach-In Chambers - Range

Biora 1200L RIC

Volume: 1200L
Style: Single compartment
Interior Dimensions: 1600Wx650Dx1200H
Exterior Dimensions: 1700Wx910Dx2070H
Exterior Material: Coated steel
Interior Material: Stainless steel
Doors: Double, condensation free observation window
Shelving: up to 6 stainless steel wire trays
Max Load per Tray: 50kg

Growth Area: 1.0m² to 4.1m²
Growth Height: 270mm to 1200mm
Connection: Mains cable with plug
Working Temperature (Lights On)*: 10-45°C
Humidity (Lights On): 50-85% (optional)
CO_2: Ambient to 5000ppm (optional)
Forced Air Circulation: Back to front
Communication: USB, optional LAN, internet

Biora 1400L RIC

Volume: 1400L
Style: Single compartment
Interior Dimensions: 1410Wx690Dx1450H
Exterior Dimensions: 2050Wx925Dx2075H
Exterior Material: Coated steel
Interior Material: Stainless steel
Doors: Double, condensation free observation window
Shelving: up to 10 stainless steel wire trays
Max Load per Tray: 50kg

Growth Area: 0.9m² to 3.8m²
Growth Height: 340mm to 1400mm
Connection: Mains cable with plug
Working Temperature (Lights On)*: 10-45°C
Humidity (Lights On): 50-85% (optional)
CO_2: Ambient to 5000ppm (optional)
Forced Air Circulation: Back to front
Communication: USB, optional LAN, internet

** Dependant on light selection*

Biora Reach-In Chambers - Features

Airflow

- Horizontal airflow is ideal for small plants and specimens
- Closely emulates natural airflow conditions
- Utilises maximum available space
- Uniform temperature across tiers

Temperature Control

- Inbuilt sensor
- Data displayed on HMI screen accessible at chamber or remote computer, when linked
- Programmable and adjustable range
- Can be independently controlled for more complex environmental conditions
- Easily access process and set value data

Programming & Data log

- Multiple programs available for step or ramp processes
- Ability for single occurrence or repeated indefinitely
- Automatic data logging
- User-friendly design

Alarms

- Audible and colour-coded alarms activate when conditions deviate within the chamber such as temperature, humidity, CO_2, pressure, power or door open
- Alarm activity visible on HMI display or connected computer

Carbon Dioxide Control (optional)

- CO_2 levels controlled at HMI panel
- Gas monitoring and injection system included with addition

Also Available: Hire & 'Hire to Buy'

Expand your research capabilities with ease and efficiency with our rental options. Select Biora Reach-In Chambers are available to hire offering a practical solution for every need.

Our 'Hire to Buy' option provides the flexibility to buy out the Biora Reach-In Chamber after 12 months of hire.

Biora Reach-In Chambers - Lighting Options

Regardless of the chamber's size or configuration, MineARC can build a customised lighting solution that will meet client specifications and spectrum requirements. Our engineers can provide varying levels of lighting control; all accessible from the chamber's HMI and remote control system.

MineARC offers a range of LED lights of varying intensities; providing complete flexibility for any project. MineARC's engineers and lighting partners can advise clients on the best lighting solution for their application.

- ✓ Custom LED lighting design based on requirements
- ✓ Control over canopy, intensity and spectrum for day time and seasonal replication
- ✓ Single and multi-tier opportunities
- ✓ Optional high-quality built-in light measurement equipment for refinement of testing conditions

LED Light Specifications

Model	Intensity ($umols^{-1}m^{-2}$ @150mm)	LUX (lx)	Voltage (V)	Colour	Size (mm)
LED SUN LIGHT Z4N	1100	30915	110/220	Adjustable	40 x 60
LED SUN LIGHT Z4N1	1200	25169	110/220	Adjustable	40 x 60
LED SUN LIGHT Z4NW	1000	74337	110/220	Day Light	40 x 60
LED Z9	1700	87162	110/220	Adjustable	40 x 60
LED SUN LIGHT Z190	400	39078	110/220	Day Light	40 x 60

LED Spectrum Data

Model	Blue (400-500)	Green (500-600)	Red (600-700)	IR(700-800)	IRR (W/m^2)	W	λp (nm)
LED SUN LIGHT Z4N	450nm ±10nm	550nm ±10nm	660nm ±10nm	730nm ±10nm	254.0	400nm - 700nm	453
LED SUN LIGHT Z4N1	450nm ±10nm	-	660nm ±10nm	730nm ±10nm	238.6	400nm - 700nm	657
LED SUN LIGHT Z4NW	400nm - 500nm	500nm - 600nm	600nm - 700nm	700nm ±10nm	218.4	400nm - 700nm	468
LED Z9	425nm - 450nm	525nm	625nm - 660nm	730nm	426.9	350nm - 800nm	449
LED SUN LIGHT Z190	400nm - 500nm	500nm - 600nm	600nm - 700nm	700nm ±10nm	107.2	400nm - 700nm	571

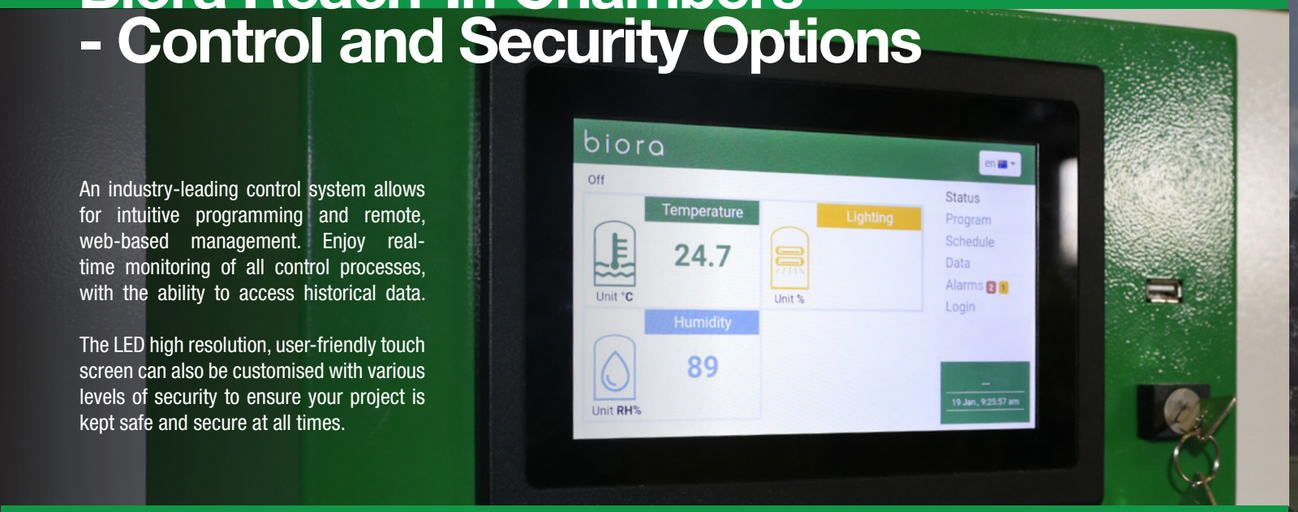
Note: Biora Reach-In Chambers are supplied with Z4NW LED lighting in single tier or Z190 LED lighting 2+ tier chambers, as standard; additional lighting options are available.

Biora UPRTek PG200N Spectrometer

The PG200N Spectrometer provides plant reference spectrum for users to compare and compensate the necessary light wavelength required by each particular plant. Utilising the PG200N will accelerate plant growth, flowering and vegetation.

- JIS AA Class and DIN B Class compliant
- IP66 rated water repellent sensor
- 350-800 nm wavelength range
- User friendly HMI
- Customisable PPFD/PFD range

Biora Reach-In Chambers - Control and Security Options



An industry-leading control system allows for intuitive programming and remote, web-based management. Enjoy real-time monitoring of all control processes, with the ability to access historical data.

The LED high resolution, user-friendly touch screen can also be customised with various levels of security to ensure your project is kept safe and secure at all times.

- ✓ Web-based software with both local and remote access
- ✓ Real-time monitoring of all control processes
- ✓ Access to historical data
- ✓ Over 50 customisable programs
- ✓ Data export and import options
- ✓ Push notifications based on custom alert settings
- ✓ Data protection and security options
- ✓ Customised HMI options and local engineering support

Chamber HMI Control

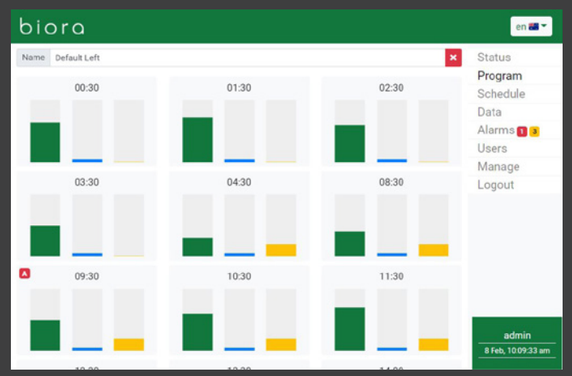
In addition to its remote capabilities, the control system can also be accessed by a user-friendly touch-screen HMI Panel, located on the face of each Biora Reach-In Chamber.

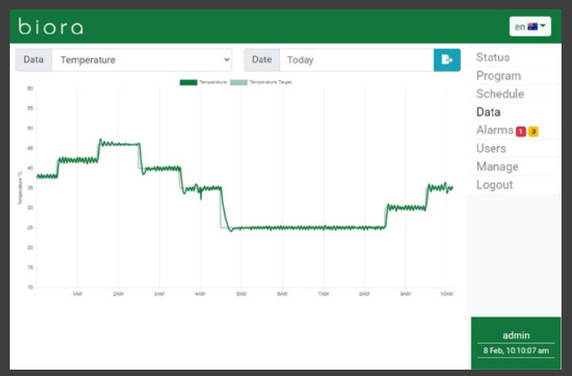
Chamber status, historical data, alarms and programming can all be accessed and controlled via the HMI.

Safety

The in-built control system provides the added advantage of security within the grow chamber; monitoring access at the chamber or remotely, including:

- Four-digit changeable pincode
- Three levels of access: user, manager, service engineer
- Electronic tracking and historical data





Biora
Custom Research Infrastructure

Tailored solutions to support any research project

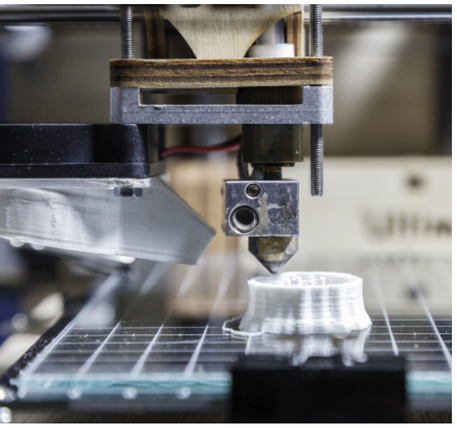
Research Infrastructure - Custom

As a leader in controlled environment technology, Biora's Custom Research Infrastructure is an innovative solution to support strong, leading research initiatives.

Research infrastructure and equipment are the foundation for delivering project benefits, reportable outcomes, and remaining current in the fast-paced nature of scientific studies.

Develop your facility's core equipment and capabilities through Biora's range of custom-designed research infrastructure. Create controlled environments tailored to niche plant growth, scientific, or medical research.

Customising research infrastructure with Biora will remove speculation over the proficiency of equipment; allowing you to focus on detail and delivery of results.



Engineering Services

As part of MineARC's **Client Support Program**, Biora's in-house team will provide expert guidance through product development, implementation, and on-going care.

The company's highly qualified engineers span three continents to form a global network. Working from our manufacturing operations in Australia, South Africa and the United States, the team share skills, knowledge and research regularly, resulting in efficient problem resolution and strong idea generation.

At times, existing infrastructure or equipment may not offer the specific capabilities required by researchers. Biora provides the opportunity to work alongside a leading team of engineers, to design, develop and refine bespoke research infrastructure to meet niche client requirements. Upgrades, or retrofits, can be also be made to existing structures to accommodate technological changes and research direction.

Research Infrastructure - In-Field Heat Chamber

Heat stress risk is a growing concern for the agricultural industry. Developing plant varieties, such as wheat and barley, that are able to overcome heat stress is critical. The Biora In-Field Heat Chamber provides plant researchers and breeders with the necessary infrastructure to screen and test on-site.

L2000mm × W1600mm x H1800mm

The design of the Biora In-Field Heat Chamber allows for maximum ingress of natural light. Its lightweight structure, combined with large pneumatic wheels, ensures ease of movement across any terrain.

Additional height permits heat stress testing on taller crop types, including canola and sorghum.

Major Features

- ✓ Lightweight aluminium structure
- ✓ Independent 1200W heaters capable of rapid heating of the environment and maintaining temperature set-point (+/- 3°C)
- ✓ Internal temperature sensor
- ✓ Digital temperature display and settings adjustment
- ✓ Data logging and download
- ✓ Front and rear exhaust fans to help stabilise temperature and prevent overshoot
- ✓ Circulating fan to ensure uniformity of temperature inside the chamber
- ✓ Powered by a mains connection or optional diesel generator
- ✓ Remote monitoring (optional)

Biora by MineARC Systems

www.minearc.com

mineARC SYSTEMS