



JKG Bio Science Pvt. Ltd.



**COMPANY PROFILE
PRODUCT CATALOGUE**



Certificates

We are committed to total quality assurance and excellence. As a professional organization we have effective quality management, which is backed by years of experience, trust of our users, and ISO 9001 certification.



Provident Fund



Central Board of Indirect Taxes and Custom



Goods & Services Tax Network



Employees' State Insurance Corporation



Government E-Marketplace



National Small Industries Corporation



Ministry of Micro, Small and Medium Enterprises



ISO 9001:2015



JKG Bio Science Pvt. Ltd.



Director's Message

Delivering for now 16+ years across the extensive Indian and International research market, we take the opportunity to express immense gratitude to our international partners and our clientage across India for their support and valuable feedback. We stand here to serve because of our treasured clientage. Cheers to the multidimensional contribution by the stakeholders, holding interest in national development, to promote healthy and vibrant relationship of vendors & scientists in the Indian laboratory market.

Along the focus of federal establishment, we hope that individual buyer & administrative procedures will get integrated with e-platforms. National initiatives like GeM, e-tendering, etc. will assist in organized procurement procedures & encourage meaningful discussions with stakeholders to promote paid service support in near future.

We are working to extend online support (JKG – International partners) to all our business stakeholders, with the help of respective Institutes/ scientists, and enable technical support at site, at an institute level (resembling pattern in – NCBS/ CCMB/ ICRISAT), in order to promote prompt services across India. We would be pleased to conduct orientation/training programs for lab users/ students & technicians for smooth operations & maintenance.

We are what we repeatedly serve. Our focus is to provide genuine, remarkable and worthwhile experience for the users to connect for better services every time.

We look forward for your invaluable input.



Sarvesh Sharma



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OUR TRUST

We work with research institutes across India. Some of our esteemed customers are:



Indian Council of Agricultural Research



Council of Scientific & Industrial Research



Defence Research & Development Organization



Indian Council of Medical Research



International Crops Research Institute for the Semi-Arid Tropics



Indian Institute of Science



Department of Atomic Energy



Jawaharlal Nehru Centre for Advanced Scientific Research



South Asian University



Department of Biotechnology



MNC



Punjab Agriculture University



Indian Institute of Science Education and Research



Central University



Indian Institute of Technology



Private Universities

ABOUT US

Company Value

JKG started its journey in 2003, since then our contribution to Indian Research Lab product supplies is to assist the Scientist and their team of researchers with a good product and after the sale, service to assist them with their research. We have emerged as a reliable product and service supplier in our focus area. We uphold the highest standard of quality and excellence and offer the most reliable brands towards modern research.

We believe in communication with trust and confidence with our clients in building of a successful business. We're always open to hearing constructive criticism for our growth and mutual benefit.

Mission



Empower users to maximize product utilization and ensure quicker resolution to minimize product downtime throughout its lifecycle.

Vision



Provide researchers across the country with world class equipment embedded with latest technology and cater tailor-made machines graced with our prompt service & reliability.



COMMITMENT

We are committed to provide products from leading international brands with tested reliability of their usage.

We are committed to provide seamless product procurement procedure following all necessary paper work and provide the best after-sales service.

We are committed to provide support over chat, call, and video call for any query regarding product operation and to troubleshoot alongside routine operations.

The JKG Advantage

- Regular Preventive Maintenance
- Long term support of spare-parts
- Absolute customer satisfaction
- On site repair
- Extended warranty & AMC
- 30+ years of management experience in the industry
- Over 1000+ installations
- 500+ users in 28+ State and Union territories
- Custom built products for specific lab needs

Assisting National
Research for a
better Future

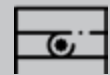
Core User Area

Our core user area and instrumentation include Environmental Controlled Chamber, incubators, shaker, BOD, autoclave, centrifuge, oven, meters. We support R&D and QC labs in sectors such as Life science research, Pharma, Cement, Food, FMCG, Biotech, Rubber, testing houses, Agri and allied Industry, etc.

- 01 Plant production, pathology, and development. Application including Growth, Co2 studies, Insect, Algae, Tissue Culture (Plates, dishes or flasks) , Germination, Dew Formation, stress (temp, RH, Co2, Light), Low Temp, High Temp, Pathology, BOD, Root Growth on plates, Entomology.
- 02 Drosophila, Mosquito, C-elegans, Mouse, Butterfly, Cockroach, beetle, Storage, Bacterial Culturing and other application specific custom designed environmental chamber for rearing, storage, day and night programming and stress studies.
- 03 Stability chamber and rooms, ICH guidelines chamber, thermoelectric chamber.
- 04 Lighting option for LED, HID, Germicidal, Aquatic, LED, Spectrum specific or consult us for your specific custom designed need or integrating available product with our chamber.
- 05 AI based integration project for Phenomics studies and Functional Phenomics system with mutual cooperation with customer.
- 06 Arabidopsis, Seed Storage, weather simulation (Real time, Historical, Climatology and Climate change Simulation) for Research and commercial application.



1000+
Installations



25+
States



500+
Users



4+
Offices



SALES

We offer a wide range of products & services to match your needs. We supply quality products from our international partners, who assist in customization of chambers to individual research needs.

We have users across India, which is a testimony of our efforts in delivering & maintaining the product with our support network across India.



INSTALLATION

With over 1000+ installations, we ensure on time delivery with uncompromised quality of the promised product, setting us apart from competition.

We provide pre-installation letter, ancillary support, technical guidance, user training, both soft & hard copy of product operation & wiring manual, along with onsite training throughout the installation and subsequent warranty phase.



SUPPORT

We provide user training & guidance to help you with anything about the product usage, engineer support.

We also provide preventive maintenance, calibration service, extended warranty, service contract, IQ-OQ, Online support, & spare parts from supplier factory as well as our own inventory for emergency repairs.

INSTRUMENT SERVICE CAPABILITIES



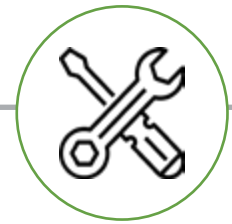
E-SUPPORT

Troubleshoot issues & clarify operational inquiries regarding the equipment leveraging e-support via phone-call, email, and video-call.



SELF RELIANCE & LOWER COST

Happy to provide basic service training to your staff engineers to promote hassle free resolution for minor glitches.



REPAIR

Specialists are available to provide prompt repair to your equipment with manufacturer guided repair process.

Our Experience

Established in 2003, JKG is an acclaimed brand amongst Indian research community as a provider of reliable product, equipped with latest technology, and quality services We have supplied units across length and breadth of India and delivered with sincere efforts of our young team to meet client needs. Our clients include research institutes and universities such as DBT, ICAR, ICMR, CSIR, ICMR, DST, DAE, DRDO, Agri Universities, IISER, IIT, MNC, UN establishments, State labs, Hospitals, Medical Colleges etc.

Our cumulative team experience of 50+ years offers honest solutions to suit your research needs.

Extended Warranty

We offer extended warranty and AMC. AMC can be done covering product spare parts and otherwise as well. We also offer preventive maintenance visits and on-site machine breakdown repairs. On request, we customize service packages specific to user requirements.

We strive to guarantee satisfaction, but in an unlucky scenario, if we can't repair the machine for some reason, we can mutually settle the payment and close the AMC on a pro-rata basis.

We conduct PM visits regularly to keep your machine in excellent working condition and increase its lifespan of trouble-free performance.

With the advancements in technology, we provide various upgradation offers to users for their chambers if available.

SALES GO UP
AND DOWN
BUT SERVICE
STAYS
FOREVER



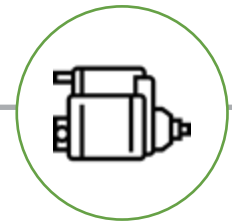
CALIBRATION

Our service team can check and calibrate your equipment to help verify your equipment and results. Third Party Calibration can also be availed.



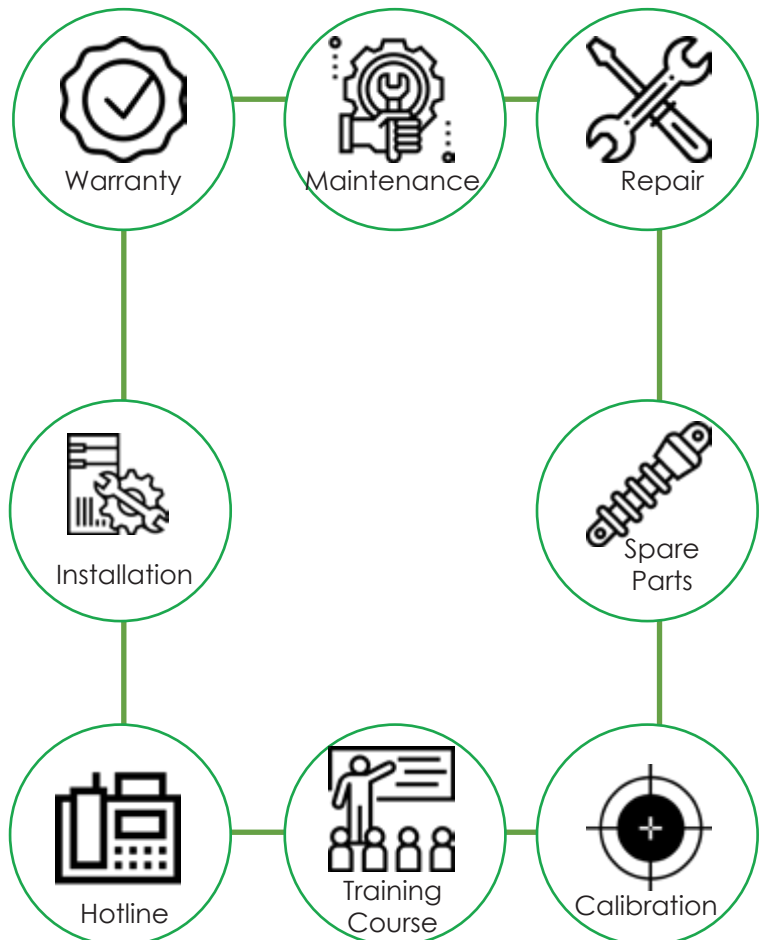
AMC/Warranty

Extended warranty & maintenance for products after the warranty period is available on request. Peace of mind. Priority response to breakdowns (Over non contract holders)



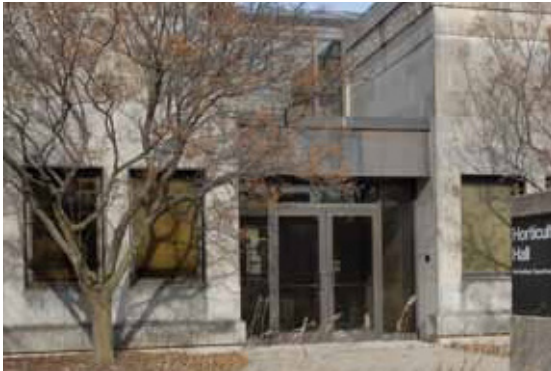
SPARE PARTS

Genuine spare-parts obtained directly from manufacturer within warranty period without any additional paperwork. Local inventory is maintained for emergency repairs.



PRODUCTS

From Percival



Percival Scientific is a global leader in helping research professionals around the world create better science. Over our 130-year history, our mission has included innovation, customization and meeting customer's exact needs.

We partner with labs across the world to accelerate research that will impact our climate, human health and food production.

Our current facility encompasses engineering, design and fabrication of environmental growth chambers for universities, colleges, government institutions and businesses both domestically and internationally. Our more than 150 different models of research chambers can be found in all 50 states and in more than 79 countries including Europe, Asia, Brazil, India, China. In 2016, Percival received the President's "E" Award for Exports from the U.S. Department of Commerce for 'making a significant contribution to the expansion of U.S. exports.'

Our ability to meet individual requirements and to control multiple critical testing variables is what has allowed Percival® Scientific to become an industry leader.



Iowa State University, Ames, Iowa



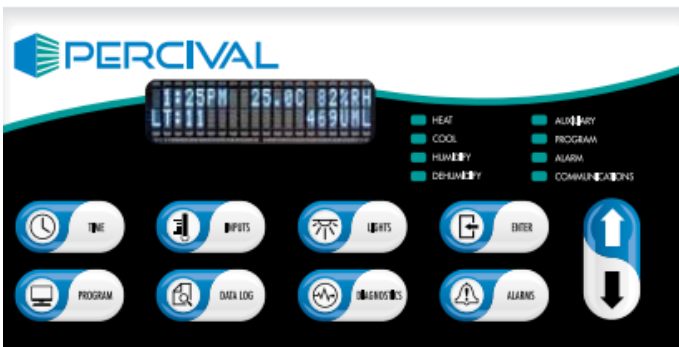
More choices. More control. More data. all available in the power of your hand!

Percival® Scientific has built a legacy of providing the life science market with the industry's best control system platforms. Through the years we've listened, tested and refined to now introduce the most advanced controller yet – the IntellusUltra!

Percival® The IntellusUltra delivers four choices of control systems letting you choose the options of what data to collect and how it is collected. Choose the one that fits your research needs and budget.



IntellusUltra



IntellusUltra C8 (standard)

The IntellusUltra C8 is the basic model and is standard on all Percival chambers. The number of output channels used for control of lighting events, logic events, convenience outlets etc. has been increased to twenty-three channels. On-board diagnostics, ambient temperature monitoring, and power failure event logging have been added to improve troubleshooting abilities. The added security of an independent temperature alarm has now been integrated into the new controller design.

- The number of output channels used for control of lighting events, convenience outlets, and other variables, has been increased to twenty-three channels.
- Improve troubleshooting with on-board diagnostics.
- Dual experiment protection with primary limit and independent secondary limit.

IntellusUltra Connect

IntellusUltra Connect C9

(remote monitoring and programming capabilities)

The IntellusUltraConnect C9 includes all of the features from the standard IntellusUltra C8 as well as on board data logging, and the ability to connect to the controller in a variety of different ways. The C9 adds remote connectivity and monitoring with e-mail notifications. An on-board USB connection allows for real time data logging with up to four gigabytes of data storage. Simply use a portable USB stick to download your data to analyze on any other capable device. An on-board Ethernet connection allows direct monitoring and analysis of chamber conditions.



Available remote monitoring software has been optimized to interface with the major web browsers. If that isn't enough, upgrade to our cloud-based service securely and confidently

- Monitor and backup your research data.
- All IntellusUltra C8 standard Intellus features
- Remote connectivity for chamber control and monitoring email notifications (requires internet connection)
- Ethernet
- Built-in web server is optimized to interface with major web browsers
- On-board data logging exportable to USB drive
- Modbus Connection for monitoring via Building Management Systems
- Cloud-based data logging

Android-based touchscreen tablet now available with IntellusUltraConnect

IntellusUltraConnect C9T (Android tablet with Percival app)

An Android-based touchscreen can be added to both the powerful IntellusUltra Connect C9 controller. This graphical user interface allows you to intuitively interact with your chamber (in a similar manner as many smartphones and personal tablets). Access real time graphing to visually confirm your experiment is operating correctly. The tablet provides additional data logging storage utilizing the available memory, while being easily exportable. Lastly, the touchscreen provides a control redundancy as the standard controller and keypad are housed directly behind it.

- High definition touch screen interface
- Graphical display of recent chamber performance (last 6 hours)
- Android-based app allows for user friendly programming interface
- Highly visible alarm display

The flexible control of testing, data collection and storage you've always wanted is here now with the IntellusUltraConnect.



WeatherEze®

welcome to the next generation of chamber control software — WeatherEze®

WeatherEze® is four programs in one. The first is a real-time weather duplicator, the second is a historical weather duplicator, the third is a climatological simulator, and the fourth is a climate change simulator. In all modes the software automatically calculates the intensity and quality of the incident solar radiation and correspondingly sets the lights or allows one to select from a Daily Light Integral table. These simulated lighting settings automatically mimic the conditions at the site at any particular time to the best of the ability of the available lighting options.

Real-time Weather Data: The software can retrieve data from reporting weather stations and then “run” the observed weather conditions in the selected chamber. The coverage for the METAR stations is denser in the U.S. and Europe; however, there are locations around the globe that enable WeatherEze® to have a global scope.

Historical Simulation: The historical simulation allows the user to run past conditions based on any location on the globe. This is based on our database collection which has undergone severe vetting in order to ensure that only time and locations with sufficient data can be run.

Climatology Simulation: The weather simulator enables the user to select any location on the globe and to run the chamber based on the simulated temperature, relative humidity, predicted CO₂ profiles, and incident solar radiation quality from that location.

Climate Change Simulation: WeatherEze® accesses its personal database to obtain climate change information based on IPCC data. This function has a number of controls based on the differing datasets, models, and emission scenarios of different climate change simulations that enable a variety of different possible future conditions.

INCUBATORS

Research scientists around the world depend on Percival Scientific's reliable incubators for many different types of applications; from bacterial culturing to plant seedling and insect rearing to B.O.D. determinations.

We are happy to discuss the variety of options and custom designs available.



Percival® model I-3NL



Percival® model I-66VL

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions						
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height		
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm	
I-30	NL Three tiers	No Light	2 - 44 ± 0.5	9.7	0.3	9.1	0.8	8.5	21.6	31.0	78.7	23.8	60.3	46.1	117.2	
I-36	NL Six tiers	No Light	2 - 44 ± 0.5	29.7	0.8	32.3	3.0	8.0	20.3	33.5	85.1	33.6	85.4	77.2	196.1	
I-41	NL Six tiers	No Light	2 - 44 ± 0.5	37.2	1.1	40.8	3.8	8.0	20.3	41.0	104.1	33.6	85.4	77.2	196.1	
I-66	NL Six tiers	No Light	4- 44 ± 0.5	62.4	1.8	64.7	6.0	8.0	20.4	66.0	167.6	33.6	85.4	77.2	196.1	
Vertical Lighting																
I-30	VL Three tiers	80	7 - 44 ± 0.5	9.7	0.3	7.7	0.7	8.8	22.2	31.0	78.7	23.8	60.3	46.1	117.2	
I-36	VL Five tiers	80	5 - 44 ± 0.5	29.7	0.8	23.6	2.2	9.5	24.1	33.5	85.1	33.6	85.4	77.2	196.1	
I-41	VL Five tiers	75	4 - 44 ± 0.5	37.2	1.1	30.5	2.8	9.5	24.1	41.0	104.1	33.6	85.4	77.2	196.1	
I-66	VL Five tiers	45	2- 44 ± 0.5	62.4	1.8	47.1	4.4	9.5	24.1	66.0	167.6	33.6	85.4	77.2	196.1	
Horizontal lighting																
I-30	LL Two tiers	100	2 - 44 ± 0.5	9.7	0.3	6.1	0.6	11.7	29.7	31.0	78.7	23.8	60.3	46.1	117.2	
I-36	LL Four tiers	65	2 - 44 ± 0.5	29.7	0.8	21.6	2.0	10	25.4	33.5	85.1	33.6	85.4	77.2	196.1	
I-41	LL Four tiers	100	2 - 44 ± 0.5	37.2	1.1	27.2	2.5	8.6	21.7	41.0	104.1	33.6	85.4	77.2	196.1	
I-66	LL Four tiers	72	4- 44 ± 0.5	62.4	1.8	43.1	4.0	10	25.4	66.0	167.6	33.6	85.4	77.2	196.1	
Vertical & Horizontal Lighting																
I-36	LLVL Four tiers	115	2 - 44 ± 0.5	29.7	0.8	18.8	1.8	10	25.4	33.5	85.1	33.6	85.4	77.2	196.1	
I-41	LLVL Four tiers	100	2 - 44 ± 0.5	37.2	1.1	24.5	2.3	10	25.4	41.0	104.1	33.6	85.4	77.2	196.1	
I-66	NL Four tiers	115	7 - 44 ± 0.5	62.4	1.8	37.7	3.5	10	25.4	66.0	167.6	33.6	85.4	77.2	196.1	

SciBrite LED series

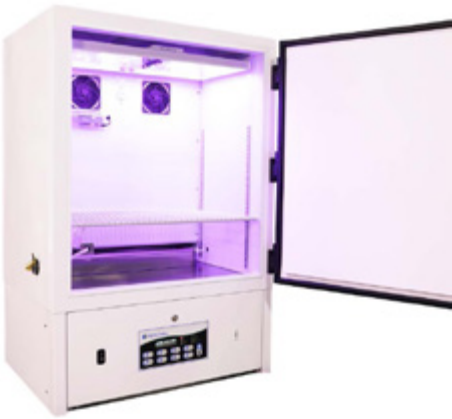
This chamber is specifically designed for plant growth light quality studies and other experiments requiring specific wavelengths of light

Create your own spectrum by adjusting the individual color spectrum ranges shown. This line of LED chambers provides the correct spectral quality at the correct irradiance with exceptional environmental control every time.

There are multiple configurations available:

- White/Red
- White/Far Red/Red/Blue
- White/Red/Far Red
- Blue/Red
- Seven Colours

Green, UV and different colors of LEDs are available upon request. Multiple channel dimming system allows control of each LED color at 10-100% of light intensity. Please contact factory for additional information and pricing.



Percival® model LED-30L1



Percival® model LED-41L2



LED

Model	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					Tiers	LED Colors	
			ft ³	m ³	ft ²	m ²	in	cm	width		depth		height			
	μmoles/m ² /s	°C							in	cm	in	cm	in	cm		
LED-30L1	1400	8 - 44 ± 0.5	9.7	0.3	3.0	0.3	25	63.5	31	78.7	23.8	60.3	46.1	117.2	1	4
LED-36L1	1550	7 - 44 ± 0.5	29.7	0.8	5.4	0.5	46	116.8	33.5	85.1	33.6	85.4	77.2	196.1	1	4
LED-36L2	1300	9 - 44 ± 0.5	29.7	0.8	10.8	1.0	20.5	52.1	33.5	85.1	33.6	85.4	77.2	196.1	2	4
LED-41L1	1850	6 - 44 ± 0.5	37.2	1.1	6.8	0.6	46	116.8	41	104.1	33.6	85.4	77.2	196.1	1	4
LED-41L2	1550	10 - 44 ± 0.5	37.2	1.1	13.6	1.3	20.5	52.1	41	104.1	33.6	85.4	77.2	196.1	2	4

Note: Each color and tier is independently dimmable

Speciality lighting

No one pays more attention to lighting design or offers more options than Percival® Scientific. Lighting options which can be purchased alone or in combination with one another include:

- Incandescent
- Full Spectrum specific fluorescents
- HID and HPS
- Germicidal
- LED
- Fluorescent
- UV
- Aquatic lighting
- Metal Halide

Patented high efficiency lamp banks

At Percival, we engineer chambers to be easy on our environment while supplying you with research standards you've come to expect (and maybe some you haven't). This is why our patented lamp banks require less energy and radiate less energy. The unique design lets you experience maximum light irradiance without sacrificing optimal temperature.



Percival® model E-30B



Percival® model E-30B



Percival® model E-30B



Reach-in plant growth chambers

These chambers are frequently used for research applications such as lighting for vascular plants to facilitate standard plant production, plant pathology research and seed germination and development.



Percival® model PGC-10



Percival® model E-75L1

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height	
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
Vertical Lighting															
E-36	VL Five tiers	300	4-44±0.5	29.7	0.8	27	2.5	9.5	24.1	42.3	126.5	33.6	85.4	77.2	196.1
	VLHO Five tiers	1000	10-44±0.5	29.7	0.8	27	25	9.5	24.1	42.3	126.5	33.6	85.4	77.2	196.1
E-41	VL Five tiers	300	4-44±0.5	37.2	1.1	34	3.2	9.5	24.1	49.8	126.5	33.6	85.4	77.2	196.1
	VLHO Five tiers	1000	10-44±0.5	37.2	1.1	34	3.2	9.5	24.1	49.8	126.5	33.6	85.4	77.2	196.1
Horizontal Lighting															
E-30	L1 One Tier	505	7-44±0.5	10.9	0.3	3.0	0.3	25	63.5	31	78.7	23.8	60.5	46.1	117.1
	L1HO One Tier	950	10-44±0.5	9.7	0.3	3.0	0.3	24.9	63.2	31	78.7	23.8	60.5	46.1	117.1
E-36	L1 One Tier	550	10-44±0.5	29.7	0.8	5.4	0.5	45.4	115.3	33.5	85.1	33.6	85.4	77.2	196.1
	L1HO One Tier	1250	10-44±0.5	29.7	0.8	5.4	0.5	45.1	114.6	33.5	85.1	33.6	85.4	77.2	196.1
	L1HID One Tier	1500 @36"	10-44±0.5	29.7	0.8	5.4	0.5	37.8	95.9	33.5	85.1	33.6	85.4	77.2	201.2
	L2 Two Tier	550	10-44±0.5	29.7	0.8	10.8	1.0	20.3	51.6	33.5	85.1	33.6	85.4	77.2	196.1
E-41	L1 One Tier	650	7-44±0.5	37.2	1.1	6.8	0.6	46.6	118.4	41	104.1	33.6	85.4	77.2	196.1
	L1HO One Tier	1150	10-44±0.5	37.2	1.1	6.8	0.6	45.1	114.6	41	104.1	33.6	85.4	78.7	199.9
	L2 Two Tier	650	10-44±0.5	37.2	1.1	13.6	1.3	20.6	52.4	41	104.1	33.6	85.4	77.2	196.1
PGC-6	L1HID One Tier	1300@36"	10-44±0.5	36	1.0	5.4	0.5	51.3	130.3	52.6	133.5	33.6	85.4	77.2	196.1
	L2 Two Tier	550	10-44±0.5	36	1.0	10.8	1.0	27	68.6	51.6	131	33.6	85.4	77.2	196.1
PGC-9	L1 One Tier	500	10-44±0.5	69.9	2.0	11.1	1.0	63.8	162.1	74.9	190.3	37.6	95.5	77.5	196.9
E-75	L1 One Tier	1100	10-44±0.5	71.6	2.0	10.8	1.0	54	137.2	76.9	195.3	37.1	94.3	78.5	199.4
PGC-10	L1 One Tier	1000	10-44±0.5	63.1	1.8	10.1	0.9	46	116.8	71	180.3	38.5*	97.8	77.6	197
PGC-15	L1 One Tier	1100	10-44±0.5	93.4	2.6	15.1	1.4	46	116.8	95.1	241.5	38.5*	97.8	77.6	197
PGC-105	L1 One Tier	1100	10-44±0.5	106.7	3.0	15.9	1.5	54	137.2	105.6	268.2	38.9	97.8	77.6	197
	L1HID One Tier	1250 @ 24"	10-44±0.5	112.9	3.2	16.2	1.5	56.3	142.9	106.6	270.8	38.5*	97.8	81.5	207
PGC-20	L1 One Tier	1200	10-44±0.5	147.9	4.2	20.1	1.9	65	165	100.5	255.3	40.6	103.2	111.1	282.3
PGC-40	L2 Two Tier	900	10-44±0.5	147.9	4.2	36.7	3.4	30.2	76.6	100.5	255.3	40.6	103.2	111.1	282.3

Note: * 35.5" when door is removed

Arabidopsis

Over the years, Percival® Scientific has designed chambers for a large number of applications. Steady demand for our Arabidopsis Series of chambers has allowed us to engineer a chamber for the optimum growth of the Arabidopsis plant.



Percival® model AR-100L3



Percival® model AR-41L3

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width	depth	height			
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
AR-36	L2 Two tiers	250	10 - 44 ± 0.7	29.7	0.8	10.8	1.0	19.8	50.2	33.5	85.1	33.6	85.4	77.2	196.1
	L3 Three tiers	250	12 - 44 ± 0.7	29.7	0.8	16.2	1.5	11.5	29.2	33.5	85.1	33.6	85.4	77.2	196.1
AR-41	L2 Two tiers	370	7.0 - 44 ± 0.5	37.2	1.1	13.6	1.3	21.1	53.5	41	104.1	33.6	85.4	77.2	196.1
	L3 Three tiers	370	10 - 44 ± 0.7	37.2	1.1	20.4	1.9	12.5	31.8	41	104.1	33.6	85.4	77.2	196.1
AR-66	L2 Two tiers	275	10 - 44 ± 1.0	62.4	1.8	20.3	1.9	20.8	52.7	66	167.6	33.6	85.4	77.2	196.1
	L3 Three tiers	275	10 - 44 ± 1.0	62.4	1.8	30.4	2.8	11.3	28.6	66	167.6	33.6	85.4	78.6	196.1
AR-75	L2 Two tiers	300	10 - 44 ± 1.0	71.6	2.0	21.5	2.0	25.9	65.9	76.9	195.3	37.1	94.3	78.5	199.4
	L3 Three tiers	300	10 - 44 ± 1.0	71.6	2.0	32.2	3.0	15.5	39.4	76.9	195.3	37.1	94.3	78.5	199.4
AR-95	L2 Two tiers	300	10 - 44 ± 1.0	95.9	2.7	28.6	2.7	25.6	64.9	95.9	243.5	37.1	94.3	78.5	199.4
	L3 Three tiers	300	10 - 44 ± 1.0	95.9	2.7	42.9	4.0	16	40.6	95.9	243.5	37.1	94.3	78.5	199.4
AR-100	L3 Three tiers	300	10 - 44 ± 0.7	147.9	4.2	55.1	5.1	20.3	51.4	100.5	255.3	40.6	103.2	111.1	282.3



Photo credit: Anand Golait, PCDB lab, IISER Bhopal.

Plant tissue culture

This line of chambers is specifically designed for plant tissue culture on plates, dishes or in flasks. Our plant tissue culture chambers minimize condensation on Petri dishes with the following features:

- Air diffuser with slow vertical airflow insulates shelf level experiments from heat generated by the underlying light fixture
- Fixed lamp banks
- Precise temperature control across your choice of 4, 5, or 6-slide-out shelves



Percival® model CU-41L4

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height	
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
CU-30	L2 Two Tiers	235	10 - 44 ± 0.5	9.7	0.3	6.10	0.6	7.1	18.1	31.0	78.7	23.8	60.3	46.1	117.2
CU-36	L4 Four Tiers	140	10 - 44 ± 0.5	29.7	0.8	21.6	2.0	7.8	19.7	33.5	85.1	33.6	85.4	77.2	196.1
	L5 Five Tiers	155 @ Shelf	10 - 44 ± 0.5	29.7	0.8	27.0	2.5	5.3	13.5	33.5	85.1	33.6	85.4	77.2	196.1
	L6 Six Tiers	155 @ Shelf	10 - 44 ± 0.5	29.7	0.8	32.3	3.0	3.6	9.0	33.5	85.1	33.6	85.4	77.2	196.1
CU-41	L4 Four Tiers	220	10 - 44 ± 0.5	37.2	1.1	27.2	2.5	7.5	19.1	41.0	104.1	33.6	85.4	77.2	196.1
	L5 Five Tiers	220 @ Shelf	10 - 44 ± 0.5	37.2	1.1	34.0	3.2	5.2	13.2	41.0	104.1	33.6	85.4	77.2	196.1

Algae

This line of chambers is specifically designed for growth of the Algae in flasks. It provides adequate space for growing the plant to maturity under controlled temperature, humidity and light conditions.



Percival® model AL-41L4

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height	
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
AL-30	L2 Two tiers	360	10-44 ± 0.5	9.7	0.3	6.1	0.6	8.5	21.6	31.0	78.7	23.8	60.3	46.1	117.2
AL-36	L4 Four tiers	350	10-44 ± 0.5	29.7	0.8	21.6	2.0	8.6	21.8	33.5	85.1	33.6	85.4	77.2	196.1
AL-41	L4 Four tiers	330	07-44 ± 0.5	37.2	1.1	27.2	2.5	8.6	21.8	41.0	104.1	33.6	85.4	77.2	196.1

Dew formation

You will find one dew chamber in the market – and that one is manufactured by Percival® Scientific. Our dew chambers employ the most recent technology to simulate the actions of the natural elements commonly required for pathology research studies.

- The plants radiate heat which is captured via special plates mounted on the side walls. The plants are maintained below the dew point of air.
- A chamber heat sink sits below the plants warming water and causing vapor from the water to rise, thus forming dew on the plants.



Percival® model I-36DL

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height	
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
I-36D	L4 Four Tiers	No Light	10 - 32 ± 0.75	29.7	0.8	19.5	1.8	10.5	26.7	33.5	85.1	33.6	85.4	77.2	196.1
I-36DL	L4 Four Tiers	500	12 - 32 ± 1.0	29.7	0.8	19.5	1.8	10.5	26.7	33.5	85.1	33.6	85.4	77.2	196.1

Drosophila

Percival® Scientific's cutting edge technology is at the core of our commitment to delivering the best products on the market today. This commitment is clear with the Percival DR-36 and DR-41 Series which is dedicated to offer the best features for Drosophila research.



Percival® model DR-36NL

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height	
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
DR-36	NL Six Tiers	No light	2-44 ± 0.5	29.7	0.8	32.3	3.0	8.0	20.3	33.5	85.1	33.6	85.4	77.2	196.1
	VL Five Tiers	80	4-44 ± 0.5	29.7	0.8	23.6	2.2	9.5	24.1	33.5	85.1	33.6	85.4	77.2	196.1
DR-41	NL Six Tiers	No light	2-44 ± 0.5	37.2	1.1	10.8	3.8	8.0	20.3	41.0	104.1	33.6	85.4	77.2	196.1
	VL Five Tiers	75	4-44 ± 0.5	37.2	1.1	30.5	2.8	9.5	24.1	41.0	104.1	33.6	85.4	77.2	196.1

Low temperature chambers

The Low Temperature plant growth chambers offer you the ability to measure cold hardiness, freeze tolerance, heat stress and exposure to a series of temperatures (spring, summer, fall and winter-like conditions). "Constant temperature defrost" allows the chamber to operate at low temperature under full lighting without temperature defrost spikes. There is not a light intensity drop-off due to low temperature. The glass side walls give a full view of each shelf without disturbing your experiment, and the glass is evenly heated over its entire surface to eliminate condensation. Exterior lampbanks reduce heat load while eliminating the need to open the chamber to remove the shelves when changing light bulbs. There is greater temperature uniformity and a lower temperature limit under full lighting.



Percival® model LT-36VL



Percival® model LT-105



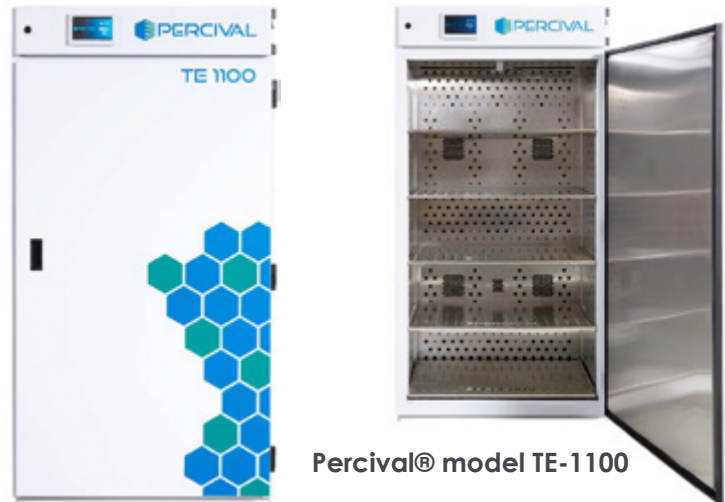
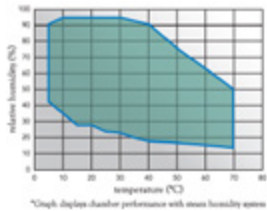
Model	Configuration	Light Intensity 6" from lamps	Tem- perature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height	
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
LT-36	VL Two Tiers	300	-10-44±0.5	29.7	0.8	10.8	1.0	21.5	54.6	42.3	107.3	33.6	85.4	77.2	196.1
	LED *HVL Four colors/Two tiers	950	-5-44±0.5	29.7	0.8	10.8	1.0	21.5	54.6	46.3	117.6	33.6	85.4	77.2	196.1
LT-41	VL Two Tiers	450	-10-44±0.5	37.2	1.1	13.6	1.2	21.5	54.6	49.8	126.5	33.6	85.4	77.2	196.1
	LED *HVL Four colors/Two tiers	950	-5-44±0.5	37.2	1.1	13.6	1.2	21.5	54.6	54.0	137.2	33.6	85.4	77.2	196.1
LT-105	L1 One Tiers	1100@25°C	-0-44±0.5	121.2	3.4	15.9	1.5	54.0	137.2	117	297.2	38.5	97.8	77.6	197.1

*A model configuration containing H designates high light intensity, standard provided four colors are Red + Blue + Far-Red + White.

Thermo electric Incubators

This chamber is specifically designed for environmental simulation, material testing and stability testing in accordance with the ICH guidelines

Temperature vs. humidity performance



Percival® model TE-1100

Model	Temp Range °C		Humidity Range (%RH)		Interior Volume		Tiers	Interior Dimensions						Exterior Dimensions					
	Low	High	Low	High	ft ³	m ³		width		depth		height		width		depth		height	
TE-1100	see note	70°C	15%	95%	37.5	1.06	5	37	94	26.75	67.9	65.5	166	41	104	36.5	92.7	79.2	201

Note: 90.1 cm (35.7") chamber depth with easy to remove door allows passage thru standard building door.
Note: 20°C below ambient.

Seed Germination

These chambers have been designed exclusively for seed germination and development. Consult factory for seed storage chambers with low or high humidity control.



Percival® model GR-36L

Model	Configuration	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width		depth		height	
		μmoles/m ² /s	°C							in	cm	in	cm	in	cm
GR-36	VL Six tiers	75	5 - 44 ± 0.5	29.7	0.8	28.3	2.6	8.0	20.3	33.5	85.1	33.6	85.4	77.2	196.1
	L Fifteen Tiers	50	10 - 44 ± 0.5	29.7	0.8	70.7	6.6	2.6	6.7	33.5	85.1	33.6	85.4	77.2	196.1
GR41	VL Six tiers	75	5 - 44 ± 0.5	37.2	1.1	41.4	3.8	8.0	20.3	41.0	104.1	33.6	85.4	77.2	196.1
	L Fifteen Tiers	50	10 - 44 ± 0.5	37.2	1.1	91.8	8.5	2.6	6.7	41.0	104.1	33.6	85.4	77.2	196.1
GR-66	L Thirty Tiers (fifteen per side)	60	10 - 44 ± 0.5	62.4	1.8	141.3	13.1	2.6	6.7	66.0	167.6	33.6	85.4	77.2	196.1

Dual chamber series

These chambers offer you the ability to have TWO separately controlled environments in ONE footprint. The dual chamber series product line offers the capability to have simultaneous experiments conducted with different photoperiods, temperature, humidity (optional) or other environmental parameters. Contact sales@percival-scientific.com with additional questions.



Percival® model CU-22L



Percival® model AR-22L

Model	Configuration	Light Intensity 6" from lamps	Tem-perature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				width	depth	height	width	depth	height	width	depth	height	width	depth	height
		μmoles/m ² /s	°C	ft ³	m ³	ft ²	m ²	in	cm	in	cm	in	cm	in	cm
AL-22	L2 Two Tiers	350	10 - 44 ± 0.5	14.6	0.4	10.8	1.0	7.8	19.8	33.5	85.1	36.6	93	77.9	197.8
AR-22	L1 One Tiers	250	10 - 44 ± 0.7	14.6	0.4	10.8	1.0	20	50.8	33.5	85.1	36.6	93	77.9	197.8
CU-22	L2 Two Tiers	140	10 - 44 ± 0.5	14.6	0.4	10.8	1.0	6.1	15.6	33.5	85.1	36.6	93	77.9	197.8
E-22	L1 One Tier	500	10 - 44 ± 0.5	14.6	0.4	10.8	1.0	19.8	50.3	33.5	85.1	36.6	93	77.9	197.8
I-22	NL Three Tiers	No Lights	02 - 44 ± 0.5	14.6	0.4	16.2	1.5	11	27.9	33.5	85.1	36.6	93	77.9	197.8
	VL Two Tiers	80	04 - 44 ± 0.5	14.6	0.4	9.4	0.9	11	27.9	33.5	85.1	36.6	93	77.9	197.8
	LL Two Tiers	65	04 - 44 ± 0.5	14.6	0.4	10.8	1.0	7.8	19.8	33.5	85.1	36.6	93	77.9	197.8
	LLVL Two Tiers	115	04 - 44 ± 0.5	14.6	0.4	9.4	0.9	7.8	19.8	33.5	85.1	36.6	93	77.9	197.8
PGC-9/2	One tier per compartment	500	10 - 44 ± 0.5	33.8	1.0	22.2	2.1	27.8	70.6	74.9	190.3	37.6	95.6	79.1	201

Note: Exterior dimensions are for entire chamber including both compartments

Environmental control rooms

Researchers from around the globe have come to expect both engineering excellence and long-lasting durability in every chamber we build. Percival's Environmental Control Rooms can be built to any size and configuration. Please contact factory for additional information.

Please contact factory for additional information on chamber sizes and configurations. Not all models shown on chart below. You may also visit Percival-scientific.com and complete the walk in survey to help us meet your needs.



Percival® model AR-89L3



Percival® model SG-99

Model	Tiers	Light Intensity 6" from lamps	Temperature Range with all lights on	Interior Space volume		Total Shelving Floor Area		Maximum Growing Height		Exterior Dimensions					
				ft ³	m ³	ft ²	m ²	in	cm	width	depth	height	in	cm	in
		μmoles/ m ² /s	°C	ft ³	m ³	ft ²	m ²	in	cm	in	cm	in	cm	in	cm
CTH-89	L5 Five Tier	10	04 -44 ± 1.0	478	13.5	160	14.9	16	40.60	96	243.8	108	274.3	102	259.1
IR-89	L5 Five Tier	90	07 - 44 ± 1.0	478	13.5	160	14.9	13	33.02	96	243.8	108	274.3	102	259.1
AR-89	L3 Three Tier	300	10 - 44 ± 1.0	540	15.3	96	8.9	24	61.00	96	243.8	108	274.3	102	259.1
PGW-40	L1 One Tier	1000	10 - 44 ± 1.0	378	10.7	43	4.0	79	200.7	120	304.8	70	178	108	274.3
PR-106	L1 One Tier	1000	10 - 44 ± 1.0	402	11.4	41.3	3.8	89	226.1	120	304.8	70	178	108	274.3
PR-1010	L1 One Tier	750	10 -44 ± 1.0	611	17.3	57	5.3	81	205.7	120	304.8	120	304.8	102	259.1
WE-1012	L1 One Tier	1000	10 -44 ± 1.0	815	23.1	90	8.4	87	221.0	120	304.8	139	353.1	104	264.2
CU-109	L3 Three Tier	240	10 -44 ± 1.0	638	18.1	120	11.1	27	68.60	116	294.6	108	274.3	110	279.4
SS-1010	L1 One Tier	No light	04 -30 ± 1.0	682	19.3	*	*	85	215.6	120	304.8	120	304.8	102	259.1

Option List

Code	Option Description	Code	Option Description
C9	IntellusUltraConnect	Q12	GLASS DOOR
C9T	IntellusUltraConnect AND Android-based Touchscreen	SB7	7 Color SciBrite LED Tiles (Blue, Deep Red, White, Far Red, Green, Warm White, Other Red)
C12	WeatherEze® Software	SB4	4 Color SciBrite LED Tiles (Blue, Deep Red, White, Far Red)
EXW	Extended Warranty (annually)	Q17	Drip Pan Adapter (hose elbow)
H1	Pan-type Humidifier with Electronic RH Sensor (additive only)	Q18	Stacking Angle (for all 30 series chambers)
H2	Atomizing Humidifier and Dehumidifier with Advanced RH Sensor	Q19	External Drip Pan
LC6	Red/Far Red LED Strips	Q22	Dimmable Lighting, CLOSED Loop Control with PAR Light Sensor
H3	Pan-type Humidifier and Dehumidifier with Electronic RH Sensor	Q23	Dimmable Lighting, OPEN Loop Control
H6	Pan-type Humidifier and Dehumidifier with Advanced RH Sensor	Q23+	Dimmable Lighting, OPEN Loop Control with Each Shelf Individually Adjustable
H8	Spray Nozzle Humidifier and Dehumidifier via Cooling Coil and Reheat Heaters Required Minimum 40 PSI Water Supply	Q28	Adjustable Sliding Shelf Assembly
H9	Spray Nozzle with Some Dehumidification via Reheat Heaters Required Minimum 40 PSI Water Supply	Q29	Left-hand Hinge/Door Swing
H11	Ultrasonic Humidifier with Advanced RH Sensor (additive only)	Q30	Additive Carbon Dioxide with 2000 PPM ensor
H12	Ultrasonic Humidifier, Dehumidification via Dehumidifying Cooling Coil (independent from cooling coil), Reheat Heaters and Advanced RH Sensor	Q31	Additive Carbon Dioxide with 5000 PPM sensor
SW	SciWhite LED Tiles	Q32	Additive Carbon Dioxide with 10% Sensor
H14	Ultrasonic Humidifier with Electronic RH Sensor (additive only)	Q33	Carbon Dioxide Removal Systems (scrubber) – Requires Q30, Q31 or Q32 to Operate
H15	Ultrasonic Humidifier and Dehumidifier with Electronic RH Sensor	R1	Temperature Recorder
H16	Humichip (electronic) – RH Sensor Only	R2	Temperature and RH Recorder
H17	Cooling Coil Dehumidifier with Electronic RH Sensor	S1	Security Package: Locking Door, Power Switch and Dry Contacts
H18	Humicap (advanced) RH Sensor Only	S2	Security Package: Locking Door, Power Switch and Dry Contacts (two doors)
Q1	Door with Fresh Air Ports	S3	Automatic Phone Dialer
Q2	Door with 12" x 12" Observation Window with Cover	WAC 1	Stainless Steel Interior
Q4	Door Lock	WAC 2	Water-Cooled Condensing Unit
Q5	Additional Steel wire shelf	WAC 3	Additional Light Assembly (2 lamps over 5th shelf) per Shelf LL Units Only
Q6	Stainless Steel Shelving	WTM 1	Extended Temperature Range to -10°C (for NLs only)
Q7	Caster Assembly with Levers	WTM 2	Extended Temperature Range to -10°C (lighted units)
Q9	Phenolic Coated Coils (Required for dorosophila {Fruit Fly} research)	WTM 3	Extended Temperature Range to +60°C
Q10	Additional Access Ports (available in 1", 2", 3" or 4" increments)	WTM 4	Extended Temperature Range to +60°C with Continuous Running Condenser
Q11	Pre-coil, Air Filter Assembly (insert screen) – Incubators and E-30B	WTM 5	Non-refrigerated Incubator (NL only) to Operate at Ambient +10°C to 60°C

CASE STUDY

Percival Scientific and Iowa State University Collaborate On The Effects of Climate Change on Plant Growth

Project will utilize a fully isolated research facility with eight independent chambers accessed by a robotic rover.

"It's been really great; it has been a wonderful collaboration. We have worked very closely with the engineers at Percival. They have been very interested in a project that had some very unique challenges, and we have helped each other through it," declares Dr. Stephen Howell, Distinguished Professor and Director of the Plant Sciences Institute at Iowa State University. Howell, formerly Director of the Division of Molecular and Cellular Biosciences at the National Science Foundation in Washington, D.C., was describing Enviratron, a project on which he has collaborated since his return to Iowa State.

BACKGROUND

"What we are really trying to do is test various plants, selected for certain traits, for their ability to respond to different environmental conditions," says Howell, explaining further that with a focus on staple crops such as corn, soybeans and rice as well as bioenergy crops such as switchgrass the project hopes to identify those plant genotypes most able to withstand the coming conditions associated with climate change. "This is a parameter on which no research has been done thus far," he adds. And a good reason exists as to why this work has yet to be done.

THE PROBLEM

Currently plants are tested under differing environmental conditions by planting them at various locations which have differing environmental characteristics and then making observations and taking measurements. This approach is fraught with shortcomings including the inability to isolate the plants from multiple influences other than climate as well as the inability to manipulate the climate to reflect anticipated future conditions. Current research facilities using plant growth chambers can only provide one climatic model at a time. This limitation inherently reduces the scope of any study to a single variable. They can vary the genotype within a given environment, but cannot vary the environment as well. And while current facilities improve isolation in juxtaposition to the Iowa outdoors, they still involve removing and transporting plants for sampling which



exposes them to uncontrollable elements that in turn introduce uncertainty in the results.

THE SOLUTION

Howell and his collaborators proposed to solve these challenges by creating a fully isolated research facility that contains eight independent chambers that will be accessed by a robotic rover that will do the sampling and testing within the chambers without in anyway altering or contaminating the environment. The unique rover will operate without remote control in a fully automated manner allowing 24-hour research and employing instrumentation including a holographic camera, hyperspectral sensor, fluorescence detector and a Raman scattering spectrometer. The robot-assisted sensing approach will enable precise location-specific data acquisition, resulting in improved sampling strategies and data quality. "The mountains of high quality data coming out of this project will be staggering,"

offers Howell of the capacity of the robotics as opposed to the utilization of lab technicians to do the testing and analyzing. "These chambers had to be specially designed to accommodate the rover which will enter the chamber through an airlock, allow for an equilibration of environment between the airlock and the chamber, and then open to allow the robot access to the plants," said Howell of this multidisciplinary project that is funded by the National Science Foundation and Iowa State University and involves not only Howell and his colleagues but the Department of Agricultural & Biosystems Engineering who are developing the robotics. And of course, Percival- Scientific.

WHY PERCIVAL

"Here at the Roy J Carver Co-Laboratory we have a number of Percival chambers that we have had for many years. They have proven to be very reliable so we were very confident about working with Percival on this project," explains Howell, echoing the opinion of universities and colleges around the country and adding that the opportunity to work with an Iowa based company was a plus as well.

"Designing chambers to be accessible via a robot was just the beginning of the challenges presented to Percival when we began the project," said Henry Imberti, Senior VP of Engineering for Percival Scientific.

This project necessitated the design of new chamber features, such as an actuated, sliding vestibule door. Not only did the door need to accommodate the unique size of the data acquisition robotics, but also needed to be remotely actuated through the chamber's central control system. Additionally, the door opening required a smooth threshold to accommodate the specialized wheel system on the robotics, while maintaining an adequate seal when closed to ensure environmental conditions inside the experiment space remain undisturbed.

Another area requiring significant development was the optimization of the vestibule environment. The main objective was to retain conditions inside the chamber environment per specifications throughout all operating scenarios. A secondary goal was to minimize system complexity for various reasons including initial cost, energy efficiency, and ease of maintenance. In the end, Percival was able to develop and deploy a design to satisfy both of these design criteria. Other design challenges included tight control of temperature, humidity, CO₂, photoperiod, light irradiance, light quality, air movement, and water potential in the soil. The chambers also had to accommodate a variety of crops such as maize, soybeans, tobacco, rice, switch grass, and low light species as well. And then finally, Percival needed to keep the design costs within the budgetary limitations.



Percival environmental control chambers awaiting placement of the robotic arm. The arm will move between each chamber and access the research materials through the sliding doors on each chamber.

THE SPECIFICATIONS

Percival was able to deliver on the design requirements and then some design features included:

Growth area: 21.5 ft² (2.0 m²)

Exterior dimensions:

Width: 106" (269 cm)

Depth: 84" (213 cm)

Height: 138" (350 cm)

Maximum growing height: 106" (269 cm)

Light intensity: 1720 $\mu\text{moles}/\text{m}^2/\text{sec}$ at 36" (91 cm) from the lamps.

Temperature range (Lights on @ 100%):

10°C to 44°C % relative humidity control range:

40% to 80% from 15°C to 30°C (Lights on @ 100%).

CO₂ control range: 100 to 5000 $\mu\text{mol}/\text{mol}$

An Air-flow design optimized through the use of CFD (computational fluid dynamics) software. The design bypass system reduces unwanted leaf movement produced by air currents while the rover is attempting to take measurements

Electrically-actuated lamp canopy that adjusts the height of the lamp bank to be closer to plant canopy for other future light sources such as LED. The lamp design also simplifies any future maintenance or service work the lighting system may require

DALI dimmable lighting allows each ceramic metal halide bulb to dim individually; enhancing the chamber's ability to produce highly uniform light intensity across the growing space

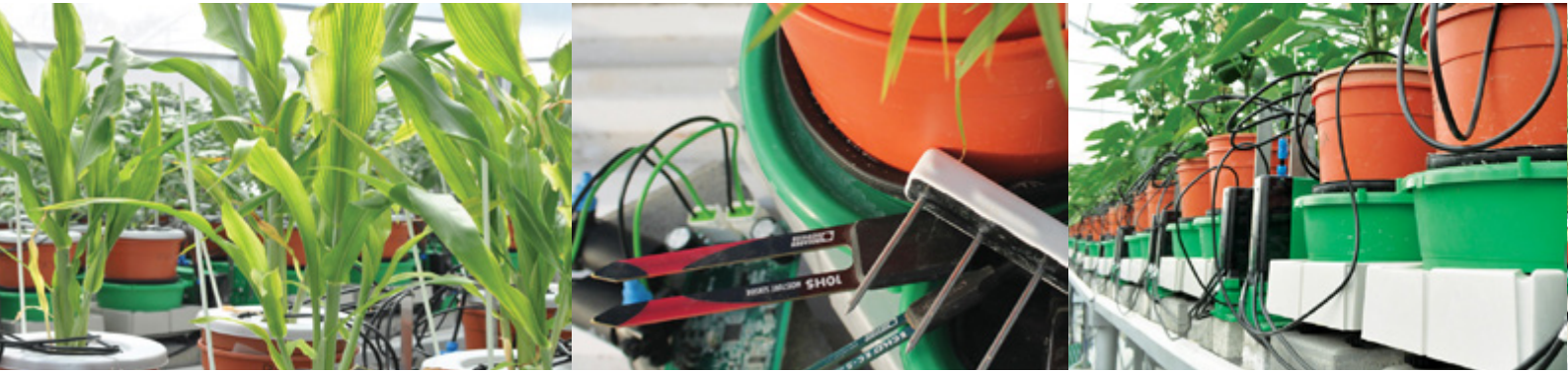
Unique software applications include Percival's proprietary WeatherEze. WeatherEze gives Howell and his staff the ability to program the chamber environment to simulate growing conditions from all over the world. Percival's IntellusUltra Control System provides a touchscreen interface as well local and remote data collection and cloud storage.

The Enviratron is now entering the third year of a three to four-year development phase. A facility has been built at the Iowa State Agronomy and Ag Engineering Farm and the eight chambers have been installed. Initial system testing is set to begin February 2017.

WHAT IT ALL MEANS

While melting polar ice caps and rising tides in South Beach are the go-to shots for photojournalists covering climate change, a much less obvious, but no less serious change is occurring in the breadbasket of the world. Climate change threatens the parameters of regional growing seasons. Research must be done now to identify those genetic traits among our food crops that will best prepare those crops to endure the gradual changes in environment that are already anticipated to occur. The Enviratron will permit scientists to incrementally alter critical variables in keeping with projected changes and will better prepare the agricultural community from the research scientist to the farmer in the field to continue to provide the products that sustain the world's population, a task of the highest priority, and one to which Percival- Scientific is honored to contribute.







Functional Phenotyping

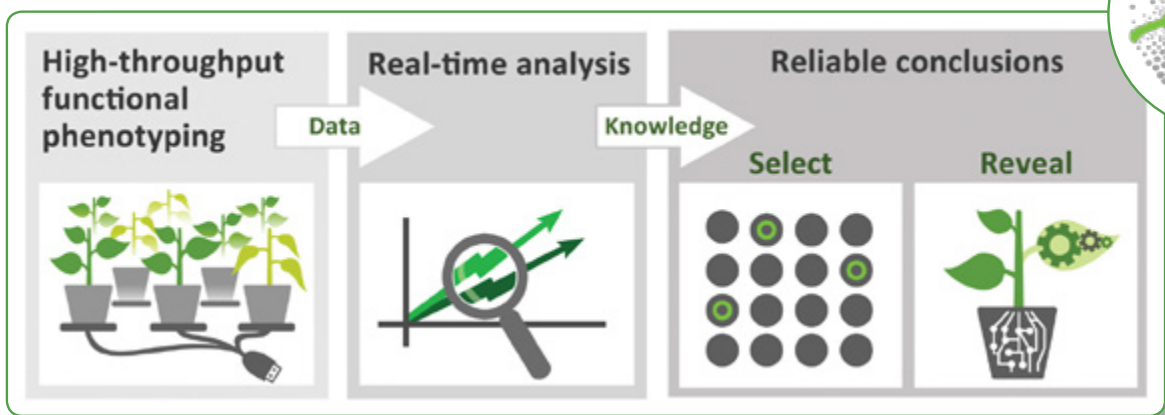


High-Throughput Whole Plant Functional Phenotyping

Plant-DiTech's Plantarray System

A fully automated, feedback irrigation system and multiple precise sensor platform that enables Agro Scientists, Breeders and Agro CROs to quickly and easily perform:

- 
 Characterization of whole-plant response to various environmental conditions with functional-physiological trait measurements such as **growth rates (bio-mass), root activity, water-use-efficiency, stomatal conductance, relative water content...**
- 
Automated, repeatedly-controlled experiments with precise output
- 
Simultaneous performance analysis to efficiently select the right plants or chemicals for imposed environmental conditions (e.g. draught, salinity)
- 
 Easy operation with **less time and manpower**
- 
 Fast **pre-field screening**
- 
 Fits into any greenhouse









Select The Best Plant

Plant-DiTech's SPAC (Soil-Plant-Atmosphere-Continuum) Analytics

Cloud-based software that performs real-time analysis, statistics and yield prediction. The SPAC-analytics process input from multiple sensors and sources to provide :

-  **Advanced statistical analysis** - multi-factorial ANOVA or paired T test for reliable and quick results
-  **Fast quantitative selection** - rate and score plant physiological response to different environmental needs
-  **Simple graphical presentation** of complex experiments - spatial and temporal relationships between measured physiological variables and the ambient conditions
-  **Real-time experimental optimization** to ensure effectiveness of the treatment when it matters



Applicable for :



Analyzing
Abiotic Stress



Develop Chemicals
and Nutrient



Functional
Breeding



Study
Eco-Physiology



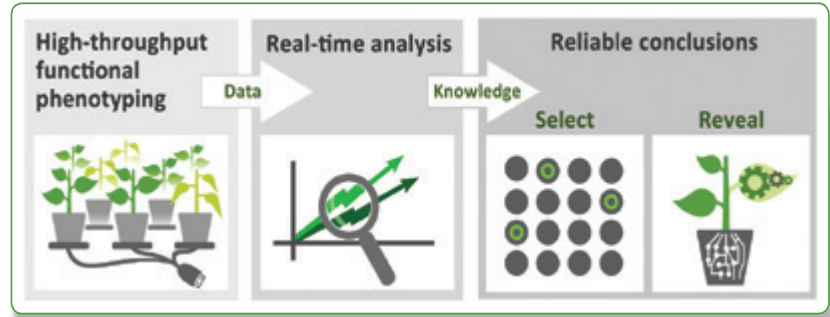
Study Roots
and Soils

Enhancing plant genetic traits with High-Throughput Whole-Plant Functional Phenotyping

A fully automated, feedback irrigation system and multiple precise sensor platform that enables Agro Scientists and Breeders to quickly and easily perform simultaneous performance analysis of whole-plant response to various environmental conditions with functional-physiological trait measurements

Applicable for:

- ✓ Analyzing Abiotic Stress
- ✓ Functional Breeding
- ✓ Study Roots and Soils
- ✓ Develop Chemicals and Nutrient
- ✓ Study Eco-Physiology



Real-time advanced statistical analysis

Functional traits:

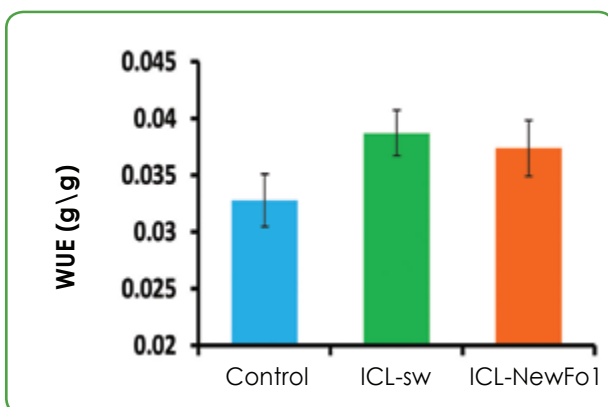
- ✓ Plant biomass gain
- ✓ Daily transpiration
- ✓ Water-use-efficiency
- ✓ Stomatal conductance
- ✓ Drought resistance index
- ✓ Relative water content
- ✓ Root performance
- ✓ Soil-water-content
- ✓ Salinity level (EC)
- ✓ VPD

Effective Screening for Biostimulants and Nutrients

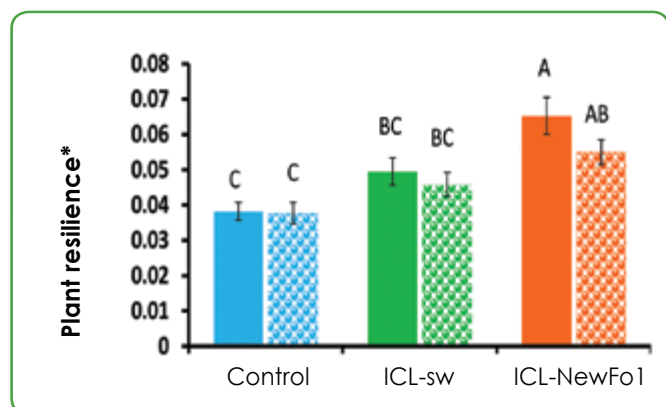
Fast and accurate screening of plant nutrient and biostimulant effects on plant performance

- ✓ Cut up to 80% of your testing time and costs Obtain definitive, precise, reliable results
- ✓ Attain deep insight into plant physiological response from biostimulants & nutrients

Biostimulant Effect on Plant Water-Use-efficiency



Biostimulant Effect Well Irrigation vs. Drought



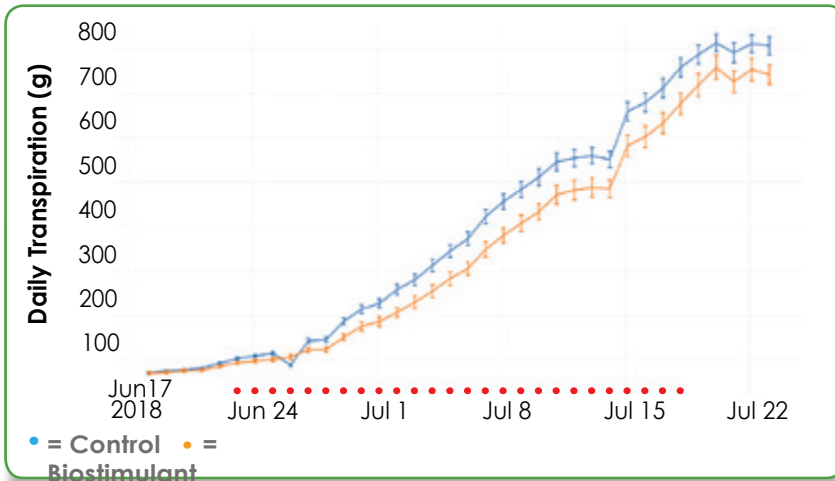
*Ratio of water reabsorption to calculated plant weight (g/g)

Case Study: Biostimulant Effects on Pepper Plant Performance

Plantarray system quantified within days the performance of two biostimulants (of ICL) under well-irrigated and drought conditions

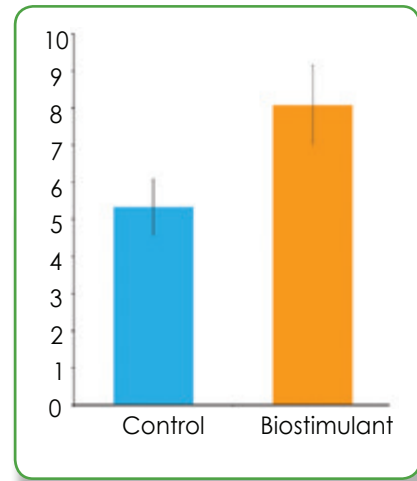
- Two biostimulants were tested, along with a normal nutrition control treatment, in order to determine the effect on sweet pepper
- One of the biostimulants significantly increased daily transpiration a few days following start of treatment

Daily Transpiration - Measured by PlantDitech



● = statistical significance

Total Fruit - Quantity



Compliance with actual yields

Handheld Devices

New Design

- Ergonomic
- Splash-Proof
- OLED Graphical Display
- Integrated GPS Module
- Li-ion Rechargeable Battery via USB port
- Communication by Bluetooth and USB



FluorPen & PAR-FluorPen

Measurement of photosynthetic activity in the lab, field or greenhouse.

- Automated measurements of Ft, QY, OJIP, NPQ and Light curves
- May be equipped with an integrated light meter for direct digital readouts of PAR

Applications

- Photosynthesis Research
- Screening and Characterization of Photosynthetic Mutants
- Field Studies
- Stress Detection
- Agriculture and Forestry
- Herbicide Testing
- Educatio

Monitoring Pen

Designed for extreme conditions

- re-programmed chlorophyll fluorescence measurement of Ft, QY, NPQ, OJIP, and Light Curves
- Long-term automated environmental monitoring
- Environmental version for field experiments. Aquatic version for underwater applications

Applications

Monitor Photosynthetic Performance

- Plant Screening in Lab and Field
- Stress Physiology
- Agriculture & Forestry
- Oceanography: Coral Physiology and Stress





AquaPen-C & AquaPen-P

- Sophisticated chlorophyll fluorescence measurements in suspensions
- Automated measurements of Ft, QY, OJIP, NPQ, Light Curves and Optical density measurements in AP-C version
- Equipped either with a cuvette (AP-C) or submersible probe (AP-P)
- Ultra-high sensitivity of 0.5 µg Chl/L in dilute suspensions.

Applications

- Photosynthesis Research of Algal and Cyanobacterial Suspensions
- Detection of Algal Contamination in Water
- Phycology and Limnology
- Oceanography
- Biotechnology

PlantPen PRI & PlantPen NDVI

- Rapid measurements of NDVI and PRI
- NDVI correlates with chlorophyll content
- PRI correlates with carotenoid content (for stress assessment)
- Inexpensive, non-invasive and easy to use.

Applications

- Rapid Screening of Chlorophyll Content
- Field and Lab Studies
- Early Stress Detection
- Nutrition Effects
- Agronomy, Forestry and Plant Physiology



N-Pen

- Rapid non-invasive measurement of leaf nitrogen content
- Absolute calibrations for wheat, maize and barley
- Relative measurement of nitrogen in all other species (can be calibrated for all).
- Rapid measurements in the lab or field

Applications

- Yield Predictions
- Increasing Nitrogen Use Efficiency
- Minimizing Yield-limiting N Deficiencies
- Minimizing Fertilizer Applications and Environmental Contamination





PolyPen

- Complete system for measurement of reflectance spectra from leaves
- Automatic calculation of all commonly used reflectance indices: NDVI, PRI, MCARI, TVI, NPCI etc.
- Allows calculation of customised indices
- Versions: · UVIS: 380 to 780 nm · NIR: 640 –1,050 nm

Applications

- Plant Screening & Field Studies
- Stress Response
- Pigment Composition
- Water Content of Plants
- Nitrogen Status
- Grain Yield

PolyPen-Aqua

- Sophisticated handheld replacement for benchtop spectrophotometers
- Measures absorbance and transmittance spectra from 380 – 790 nm
- Biotechnology, limnology, ecology, molecular biology, chemistry, forensic science etc.

Applications

- Quantitative and Qualitative Analyses of Solutions
- Growth Monitoring of Autotrophic and Heterotrophic Microorganisms
- Spectral Measurements of Cell Suspensions
- Pigment Composition
- Protein Analysis



SpectraPen SP 110

- Rapid measurements of absorption, reflectance, transmittance, emission, color and fluorescence of various samples
- Indoor and outdoor visible light source testing
- Spectral measurements of optical filters and screens



LaiPen

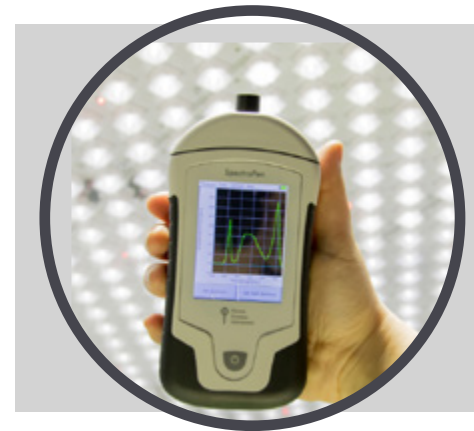
- Specially developed for measurement of Leaf Area Index (LAI)
- Studies of canopy growth and productivity
- Rapid, repeated measurements for large-scale screening programs

Applications

- Canopy Growth and Productivity
- Forest Dynamics
- Impact of Air Pollution and Insect Damage on Foliar Health
- Remote Sensing
- Global Carbon Cycle

SpectraPen LM 510

- Rapid measurements of light intensity and spectral quality in the lab, greenhouse or field
- Handheld spectroradiometer measures irradiance in radiometric or photometric units.
- Calibrated for visible light between 380 – 780 nm and into the NIR between 640 – 1,050 nm



High Pressure Steam Sterilizer



SX-300

SX-500

SX-700

Cooling fan provided as a standard feature

A rapid air-cooling function (vessel-cooling fan) permitting reduction of chamber cool down time is provided as a standard feature. This is most appropriate for lowering the temperature rapidly on completion of the cycle. The time required for lower the temperature is much reduced by employment of the cooling fan in comparison with natural cooling.

Timer function

The operation starting time can be preset easily. By presetting the start of operation, otherwise wasted periods at night or early morning, can be used effectively.

Auto-variable exhaust speed

A function allowing the exhaust valve to open automatically after completion of sterilization is provided. The exhaust speed can be set to one of six levels (set to variable for liquid sterilization)

Setting to 100°C is possible

Variable temperature setting such as to 100°C as well as to 121°C has been made possible. The temperature can be set within the range from 45°C to 135°C in steps of one degree (heating mode up to 104°C).

Model Name	SX-300	SX-500	SX-700
Operating temperature range	During Sterilizing: 105 ~ 135°C(0.019 ~0.212MPa) During Heating: 45 ~ 104°C(0.0 ~0.015MPa) During Warming: 45 ~ 95°C		
Maximum operating pressure	0.263MPa		0.25MPa
Heat source	1.5kW electric heater	2.0kW electric heater	3.0kW electric heater
Chamber Dimensions	φ325 x 553mm	φ325 x 733mm	φ370 x 774mm
Dimensions	φ315 x 458mm	φ315 x 638mm	φ360 x 675mm
Safety Devices	<ul style="list-style-type: none"> • Water level sensor, • Current leakage breaker, • Lid interlock, • Over-heat prevention, • Over-pressure prevention, • Open temperature sensor detection, • Safety valve 		
Capacity of chamber	Effective internal volume:36L, Internal volume:44L	Effective internal volume:50L, Internal volume:58L	Effective internal volume:69L, Internal volume:79L
Chamber Material	SUS304		
Weight	50kg	60kg	72kg
Power consumption (calorific value)	1.5kW (1290kcal/h)	2.0kW (1720cal/h)	3.0kW (2580cal/h)
Accessories	Stainless baskets 1 (φ300 x 181mm)	Stainless baskets 2 (φ300 x 181mm)	Stainless baskets 2 (φ345 x 181mm)
	<ul style="list-style-type: none"> • Chamber bottom Plate 1, • Caster stoppers 4, • Operation Manual 1, • Clear folder (for storing the operation manual) 1, • Screw (for attaching the clear folder) 1, • Warranty card 1, • Customer card 1, • Inspection Sheet 1 		

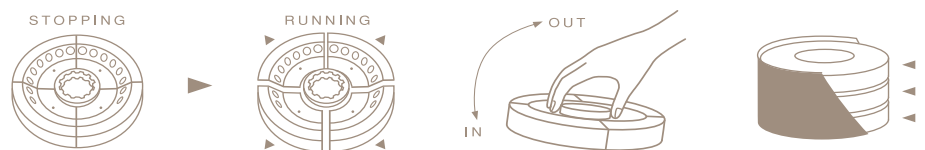
High Speed Refrigerated Centrifuge



Tomy MDX 310

"Rack-in-Rotor" system is using a combination of carbon fiber rotors and a variety of drop-in racks made of resin for greater convenience, higher performance and lower cost.

- Stackable, drop-in/lift-out rotor racks for racks for easy placement and removal
- Lightweight, yet stable rotation, and excellent acceleration / deceleration performance
- A wide variety of racks available at affordable prices
- A portable rack for sample tubes



Intuitive Operation Panel with Touchscreen



Operation status is clear with color LED Display



Numeric Keypad available

Specifications	MDX 310
Maximum Speed	15,000rpm
Maximum RCF	21,130G
Maximum Capacity	50ml× 4
Temperature Setting Range	From -9°C to +35°C (1°C increment)
Time Setting Range	10sec to 99min 50sec (in 10sec increments or (Free) for a continuous run)
Safety Devices	<ul style="list-style-type: none"> • Imbalance detector • Over-speed detector • Lid interlock • Motor over-current detector • Over-current circuit breaker • Lid open / close detector • Overheat / Overcool detector • Rotor identification system
Drive Motor	Induction motor
Refrigerant	HFC R134a (260g)
Power Requirements	1-Phase AC120V 60Hz 15A 1-Phase AC220-240V 50/60Hz 10A
Net Weight	62 kg

Cooled Shaker Incubators



LOM-150



Universal platform
for LOM-150
111-1-111143

LOM-150-Series, 150Liter Shaking Incubator, Orbital Motion

This multipurpose model can shake, incubate & refrigerate. The 480x380mm platform accepts flasks up to 6 Liter. Large viewing window & internal light provide clear chamber visibility, with moveable window blind. One stationary shelf for incubating added samples with a front opening door, the LOM-150 can be used on the bench or on the floor, wide temp. range 0°C to 60°C. Model LOM-150D: two stage shaker enable to shake two platform simultaneously. Useful for biological culture under various temperature.

- Inside material is SUS304 & outside body is powder painting
- Screen-touch panel
- The compressor will be delayed to start working if power cut and with timer for defrost.
- With safety switch to stop shaking when opening door Three-point bearing transmission is adopted suitable for heavy loads and continuous duty.
- Minimum noise, no vibration.
- Refrigeration using non cfc gas R134A Transparent glass observation window & internal light.



LOM-150

- Provide clear visibility without opening the door.
- Uses brushless AC motor for long durability and stable performance of the shaking system.
- Overheat and over low protector, built-in circulating fan for temperature uniformity.

Model	LOM-80	LOM-150	LOM-150D
System	Forced air circulation		
Shaking system	Orbital		
Shaking platform	Single		Double
Temp. range	0°C~70°C		
Temp. constancy	±0.1°C		
Temp. uniformity	±1°C (at 37)		
Temp. control/display	PID/LED		
Temp. sensor	PT-100Ω		
Inside material	SUS-304		
Speed Programmer	20~300 rpm (option 400 rpm)		20~150 rpm
Shaking width	25 mm		
Shaking plate	W440xD340	W480xD380	W480xD380 Double platform
Refrigerator	1/4 HP		
Heater: Incubator	900W		
Safety devices	Short circuit breaker, over heat protector, refrigerator over load protector, sensor abnormality, over low protector		
Inside dimensions (mm)	W500xD400xH400	W600xD500xH500	
Outside dimensions (mm)	W580xD590xH790	W680xD690xH860	
Volume (Liter)	80	150	
Shelves	1 (Adjustable)		N/A
Power supply	110/220V, (8.5A)		
Weight	78Kg	98Kg	100Kg

Capacity for flasks holders:

Model	111-1-110125	111-1-110250	111-1-110500	111-1-111000	111-1-112000	111-1-113000	111-1-114000	111-1-115000
Flask clamps	125ml	250ml	500ml	1000ml	2000ml	3Liter	4Liter	5Liter
LOM-80	20	12	6	4	2	1	1	-
LOM-150	30	20	12	6	5	4	2	1
LOM-150D	30x2 set	20x2 set	12x2 set	-	-	-	-	-

Cooled Dual Shaker Incubators



LOM-175-Dual

LOM-175-Dual/LOM-175D-Dual, Orbital Dual Shaking Incubator Features:

- Useful for biological culture under various temperatures
- Inside material is SUS304 & outside body is powder painting
- Screen-touch panel
- The compressor will be delayed to start working if power cut and with timer for defrost.
- With safety switch to stop shaking when opening door
- Three-point bearing transmission is adopted suitable for heavy loads and continuous duty.
- Minimum noise, no vibration.
- Refrigeration using non cfc gas R134A
- Optional day/night light with timer.
- Transparent glass observation window & internal light.
- Provide clear visibility without opening the door.
- Uses brush less AC motor for long durability and stable performance of the shaking system.
- Overheat and over low protector, built-in circulating fan for temperature stability.

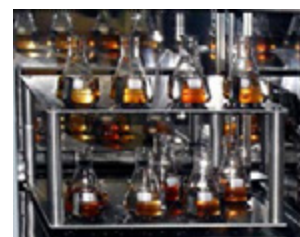
Optional: Tube Holders



Flash Holders



Double Platform



Model	LOM-175-Dual	LOM-175D-Dual
Platform	Single	Double
Temp. range	0°C~70°C	
Temp. Accuracy	±0.1°C	
Temp. control	PID	
Temp. Display	LED 2-screen digital display actual and setting temperature	
Speed Programmer (9 steps)	20~250 rpm (option 400 rpm)	20~150 rpm
Shaking width	25 mm	
Timer	999h / 999min / 999sec	
Heater	900 W each chamber	
Refrigerator	1/4HP	
Volume	Each chamber 175L	
Shaking Plate Size (mm)	640x440	
Inside dimensions (mm)	W700xD500xH500	
Outside dimensions (mm)	W780xD690xH1720	
Shelves	1 Adjustable	N/A
Weight (Approx.)	170Kg	180Kg

Capacity of flask holders:

Model	111-1-110125	111-1-110250	111-1-110500	111-1-111000	111-1-112000	111-1-113000	111-1-114000	111-1-115000
Flask clamps	125ml	250ml	500ml	1000ml	2000ml	3Liter	4Liter	5Liter
LOM-175-Dual	40x2 set	28x2 set	20x2 set	12x2 set	6x2 set	6x2 set	2x2 set	2x2 set
LOM-175D-Dual	40x4 set	28x4 set	20x4 set	-	-	-	-	-

GroBanks



The most flexible system for your individual application

The modular multi-tier GroBank Concept offers you the possibility to grow different plants under different light and temperature conditions in a single temperature-controlled room.

CLF GroBanks are research grade equipment providing precisely controlled growth conditions. Each tier is equipped with its individual digital controller and can be programmed separately.

Photoperiods and temperature, the maximum growing height and the watering regime can be defined individually for each tier.

In just one GroBank you can have cell cultures, seedlings and lowering plants at the same time – each one under optimal conditions.



Model Features	BB--XXL ¹	BB--XXL ²	BB--XXL ^{2LH}	BB--XXL ³	BB--XXL ³⁺	BB--XXL ⁴
Lamp banks	1	2	2	3	3	4
Standard light intensity (µmol)	600	450	1X300 AND 1X 450	300	300	250
Optional max. light intensity (µmol)	1000	650	2 X650	450	450	300
Shelf dimensions (W x D, in mm)	870 x 790 (x2)					
Grow area (m ²)	1,37	2,74	2,74	4, 11	4,11	5,48
Growing height	1450	780	1 x 1070 and 1 x 780	2050	500	315
Height (mm)	1980				2050	1980
Width (mm)	2140					
Depth (mm)	825					
Sample Applications	"Tobacco, Maize, Tomato"	"Cereals, Rice, Soy-bean"	"Tobacco, Maize, Cereals"	"Arabidopsis, Melilotus, Potato"	"cereals, Soy-bean, Melilotus"	"Cell cultures, Algae, Physcomitrella"

Multiply your existing growth space

Multi-tier GroBanks multiply the available growth space in each climatized room. CLF GroBanks offer an economic solution for existing temperature-controlled rooms without the need of construction work. The modular concept allows different growing heights and shelf-layouts for each Tier. The vertical arrangement of two, three or four tiers together with the concertina doors result in a remarkable large growth area on a very small footprint – therefore CLF GroBanks are simply perfect for accelerating research work. Each GroBank is installed on castors for easy mobility.



Many different applications in one instrument

Some of our customers grow different plants like Arabidopsis, Maize and Cereals in different tiers of the same GroBank.



CLF GroBanks offer an optimal solution for plant tissue cultures – the unique air-flow system reduces the unwanted condensation on the lids of Petri-Dishes significantly.



A thermal barrier for each lampbank makes it possible to control the temperature on each shelf precisely and guarantees for constant light intensities.

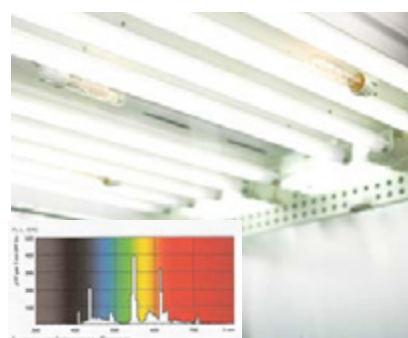
Existing applications in CLF GroBanks are plants and cell cultures of: Tobacco, Arabidopsis, Maize, Cereals, Melilotus, Algae, Physcomitrella ...

Energy-Efficient and Cost-Effective

The light-yield of CLF GroBanks is 30 % higher compared to openshelf- systems. GroBanks offer a completely contained growth space with highly reflective panels on all inner surfaces so that all radiation can be used for plant growth without any losses due to stray light. As a result, much higher light intensities can be reached with the same number of lamps. Special fluorescent lamps with internal reflectors provide a superior light efficiency.



The thermal barrier between the growth area and the lampbank can be easily removed without tools for exchanging the lamps.



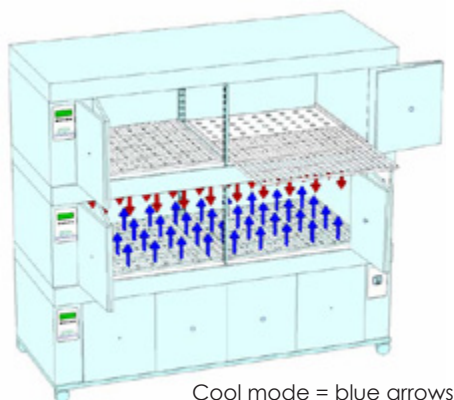
The dimmable fluorescent lamps offer the ideal light spectrum and intensity for almost every plant growth application.

Light System

CLF GroBanks are equipped with dimmable (10 – 100 %) fluorescent lamps. The combination of fluorescent lamps with internal reflectors and compact fluorescent lamps provides excellent light uniformity over the whole work area. Incandescent lamps or optionally GroLED complement the fluorescent spectrum and provide an extra portion of red and far red light. Fluorescent and incandescent lamps can be programmed separately for Dawn / Dusk photoperiods. Reflective panels on the inner walls and doors spread the light evenly for an excellent light uniformity all the way into the corners and along the sides. High light intensity lampbanks with up to 1000 $\mu\text{mol m}^{-2} \text{s}^{-1}$ are available. Each tier is light tight and can be programmed separately. Tiers which are temporarily not in use, can simply be turned off to save energy. The independent control of each tier is ideal for “long day/long night” applications.

The air flow system

The air flow system was designed to simulate natural conditions for your plants - it assures, that the plant roots always remain cooler than the leaves. The forced air flow eliminates temperature gradients and provides homogenous growing conditions. In the heating mode the lamp heat is actively used for temperature control to reduce energy costs. In the cooling mode the lamp heat is directly conducted out of the growth space. This upward air-flow through perforated diffusers reduces significantly unwanted condensation on the lids of Petri-dishes. A thermal barrier between the growth area and the lampbank allows low temperatures and high light intensities at the same time.



Cool mode = blue arrows
Heat mode = red arrows



Adjustable, slide-out shelves The shelves in each GroBank can be easily adjusted in height for the different stages of plant growth. The slide-out non-tilt shelves allow for convenient inspection or loading of plants and cell culture vessels.

The slide-out non-tilt shelves allow for the convenient loading of plants, the low velocity air flow assures an excellent temperature homogeneity

The CMJ controller offers diurnal day/night programs and circadian rhythm programming of temperature and light intensities. All GroBanks are equipped with adjustable over and under temperature safeties to protect the plants reliably.

Options In addition to our standard models, the EcoBoy is a low budget solution. The FlexiBoy range stands for individually customised GroBanks. Please contact us to find the best solution for your individual application. CLF GroBanks can be equipped with fully automated watering systems. Surface-Tensiometers constantly monitor the soil moisture and regulate the high-precision watering system. The optional ControlCommander offers a ramping mode for temperature and light intensity, a data logging function and real time control. All GroBanks can be equipped with remote alarm contacts or autodial systems.



PlantMaster temperature-controlled rooms CLF Plant Master rooms provide the ideal environment for CLF GroBanks. They can be designed to optimise every available space from the cellar to the roof. A PlantMaster room assures a maximum in effective growth area with efficient energy management

Apogee Instruments

apogee[®]
INSTRUMENTS

PYRANOMETERS



Measure total solar radiation.
ISO 9060:2018 Class C rated.

QUANTUM SENSORS



The tool of choice for researchers and agricultural professionals measuring photosynthetically active radiation (PAR) all over the world.

NET RADIOMETERS



Measure all four components of net radiation with a digital output that saves datalogger channels. Research-grade accuracy at a lower cost.

INFRARED RADIOMETERS



High-accuracy, non-contact surface temperature measurement in harsh environmental conditions.

CDR



CHRYSSAGIS

Pharmaceutical & Cosmetics Stability test Rooms & Chambers

CDR's ENVIMED rooms & chambers CMP4 series have been specially developed to meet every test requirement in research, pharmaceutical, cosmetic, food, metrology quality control laboratories or industries. CDR stability test Rooms can be built to blend with architectural features of new or existing facilities. They are manufactured at any dimensions to meet particular room restrictions, to suit customer's specific requirements or to effectively accommodate any budget.

Conform to ICH Q1A Guidelines for the 4 Climatic Zones & the Relevant Studies



CDR's ENVIMED reach-in chambers are available in 500, 1500 ltr also developed to meet every test requirement research, pharmaceutical, cosmetic, food, metrology quality laboratories or industries. Remote control & remote monitoring possible intranet or internet. Optional special stainless steel wire sliding out drawers provide easy specimen handling even at full load.



Freeze & Thaw test chambers

The FRZ /wa ramp series chambers are designed to meet different standards that are performed by subjecting products to cycles of freezing in air and thawing in water in order to determine the freeze resistance of materials like adhesives for tiles, clay roofing, concrete specimens, plasterboard etc. This apparatus replaces two different appliances and that it reduces time and labor cost because it is repeating the required number of freeze and thaw cycles automatically.

Conform to : ASTM Wk13976, C1262-05a , EN 539-2, En1348, EN 12467, AASHTO T103-91/1996, ASTM C666-2008 method A/B



Accelerated carbonation test chambers & rooms



Specifically designed chambers for studying concrete's deterioration in a very short time. User transfers test specimens to the enclosed ACC test chamber where high CO₂ concentration is accelerating the carbonation process. In our ACC series curing chambers users have absolute control of the process with the precise simulation of the desired atmosphere's composition as well as the control of temperature and relative humidity. They are available in 500 & 1000 ltr sizes as standard and at any other size by request.

Controlled atmosphere storage Test chambers & rooms



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Concrete, mortar & cement specimen Curing chambers



**ECC/WB Series
Bath-Chambers**



**ECC Enviroment
Controlled Chambers**



**ECC Complex Series
Hybrid Chambers**



**ECC Walk in Series
Transportable Curing Rooms**

All ECC series chambers conform with EN 206-1, BS EN 196-3 & ASTM C511-98 standards. ECC standard models control temperature & relative humidity at full saturation. ECC/wb series bath chambers are replacing common water baths. They are available in 54, 108, 162 pcs capacity of 150x150x150mm cubic specimen or 400, 800, 1200 pcs capacity of 40, 1x40x160 and 50x50x50 specimen. ECC complex models are provide both water bath drawers and control of temperature and relative humidity at saturation.

ECC Walk-In Series concrete specimen curing rooms, are specifically designed to conform to EN 206-1 & ASTM C 51198 standards in order to be used in construction sites from construction companies and from quality control laboratories. Walk-in DG/EXT models re designed under IP66 degree of protection to be used safely outdoors in the open air.

ECC

Programmable accelerated Curing tanks



CDR HiH-PB series water baths are designed to execute ASTM C684 test method for curing test specimens in an environment that accelerates the development of concrete's strength. This chamber complies both with ASTM C684 (Procedure A, Warm water method at 35°C & Procedure B, Boiling water method), and BS 1881:112 for 35-55°C hot water method.

Reach-in Seed Storage Chambers For Genetic Conservation

CDR's SDM series chambers reproduce the cool and dry environment conditions (+4°C & 15% rH) that according to International Board for Plant Genetic Resources is required to preserve lifespan of active seed collections in medium term storage. They are equipped with wire racks or special metal wirebaskets/drawers which provide fast and easy access.



Reach-in & Walk-in Plant Growth & Seed Germination Chambers Special Entomology and Dew formation models

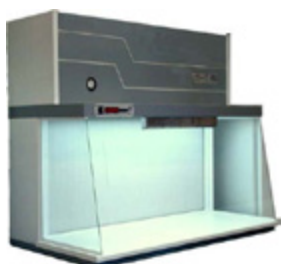


CDR CHRYSSAGIS manufactures a wide number of reach-in and walk-in plant growth chambers. Reach-in models are available from 300 to 1500 Ltr internal working space and walk-in models at any dimension at a precision of 1cm in order to meet particular room restrictions or to effectively accommodate any budget.

All GRW plant growth chambers are available in various configurations and growth heights. They are equipped with CMP4, CDR's advanced programmable control system that provides simulation of the desired environment with high precision and reliability. CMP4 controls temperature, relative humidity, light intensity-quality-photo-period and optionally drip irrigation, fertilization, CO₂ concentration plus any atmospheric composition by order. As standard CMP4 chambers are equipped with VNC server which allows to be remotely monitored from a number of devices (laptops, desktop PCs, tablets, and cell phones). Special designed models are available for entomological research as well as dew formation models for plant Pathologist's research work. Seed Germination chambers are designed under ISTA regulations.

CDR plant growth chambers and seed germinators are always available at competitive quality vs price ration.

Horizontal Laminar flow benches



CDR's LMR series Horizontal Laminar Flow benches are USP 797 compliant and designed for the handling of sterile products in an aseptic working environment for critical processes. The work area is continuously bathed with positive pressure ISO 5/Class 100 horizontal laminar flow air that has passed through a High Efficiency Particulate Air (HEPA) filter to prevent contamination. They can be used for semiconductor wafers, biological samples, tissue culture or any particle sensitive materials.

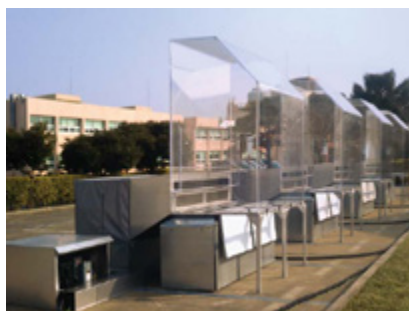
Day-Lit Plant Growth Chambers

EGC's Day-Lit chambers bridge the gap between artificially lit growth chambers and field studies in actual sunlit conditions. Sunlit controlled environment chambers, also known as SPAR (Soil Plant Atmosphere Research) chambers, have been a valuable tool in researching plant responses to environmental variables. Day-Lit SPAR units offer precise control of environmental variables including temperature, humidity, atmospheric carbon dioxide concentration, and soil moisture while allowing plants to grow under natural sunlight.

Originally developed to meet the research needs of the United States Department of Agriculture, Day-Lit series chambers are designed as freestanding outside units and are not dependant on a surrounding greenhouse enclosure. Each of the three models consists of a base for the plant growth container, a self-contained mechanical system, and a clear acrylic top to enclose the growth area and provide natural lighting.

The clear acrylic top construction provides transmissivity of 95% or better of ambient PAR (400-700 nm) for optimum lighting. The frameless upper construction allows equalized distribution of sunlight within the chamber, free of shadows and obstructions from framing members. The result is even, natural lighting, as close as possible to that received by field-grown crops.

The Day-Lit chamber is controlled by EGC's standard TC2 microprocessor controller. The temperature is modulated by a remote refrigeration package that is located adjacent to the chamber, in its own weatherproof housing. Multiple unit installations can be provided utilizing a shared chiller system with secondary medium chilled glycol coils instead of individual compressor packages if desired.



DAY-LIT

The base Day-Lit chamber provides 13 ft² (1.2M²) of growth area, and contains the mechanical equipment in the insulated base compartment beneath the growth area. Air flow is delivered upward through the perforated floor, and collected through the return plenum at the rear of chamber. The Plexiglas cap includes a hinged gasketed door covering the full front of the chamber as well as a smaller convenience door for quick access.

Over all exterior dimensions:

49" w X 49" d X 109" h
1245 X 1245 X 2767

Plexiglass case ext dimensions:

49" w X 49" d X 72" h
1245 X 1245 X 1829

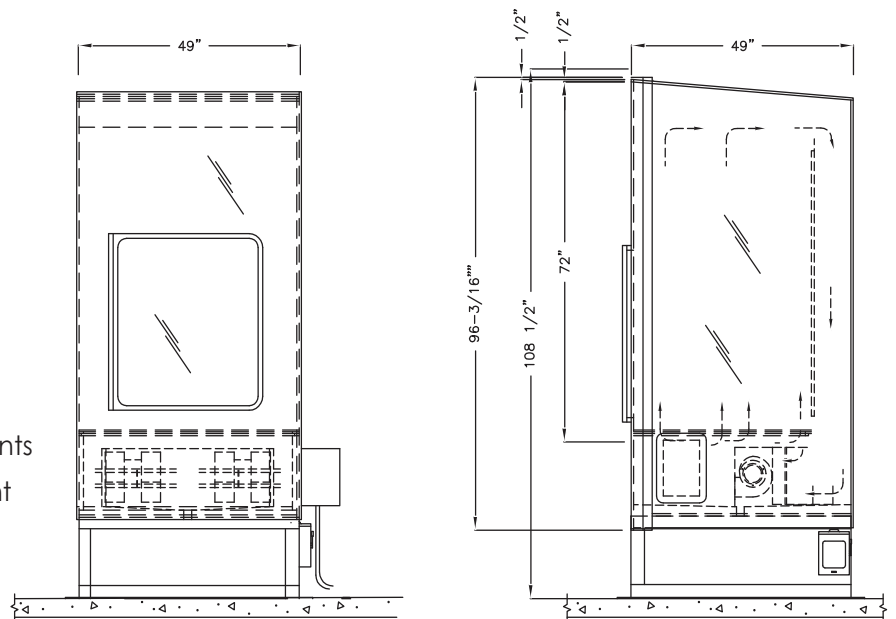
Condensing unit footprint:

34" x 44" x 21" h
864 x 1118 x 533

½" thick Frameless Plexiglas construction

Gasketed Hinged Door: for access to plants

Insulated Base Mechanical Compartment



TEMPERATURE RANGE - 10°C to 50°C limited by a 30°C temperature differential between the chamber air temperature and ambient Temperature controlled by attached refrigeration system and integral heaters.

REFRIGERATION SYSTEM - Weatherproof condensing unit package adjacent to chamber Recirculation fans and heaters within base mechanical compartment Evaporator coil with copper tube and aluminum fins Humidity control included in mechanical system

ELECTRICAL SERVICE REQUIREMENTS Control panel : 120/208V, 3 phase, 60 hz, 4 wire (plus ground) Condensing unit: 208V, 3 phase, 60 hz, 3 wire (plus ground) Other configurations available upon request.

MICROPROCESSOR CONTROLLER : -TC2-Micro Controller standard Closed-loop temperature control with proportional and on/off outputs 8 open-loop control circuits for other on/off switching operations User scalable 4-20 mA sensor support Selectable global ramping for temperature control 3 line LED display with backlit LED output indicators and function annunciators. 200 time line program steps Non-volatile program and parameter memory, battery backed clock and data logging Multi-drop RS485 communications for interconnecting groups of controllers Standard RS232 communications for remote computer monitoring and setup Ethernet connectivity for remote access and monitoring 4-20 mA outputs definable for control(s) or sensor monitor(s) User definable alarms: Two stage alarm output; Alert and shutdown **OPTIONAL ACCESSORIES** Remote condensing units Chilled water system for multiple unit installations CO₂ Monitor / supply system for research in elevated levels of CO₂ Additional sensors available upon request.

Contact EGC for details. ControlNet datalogging software (Not available in all locations)

DAY-LIT SB (Soil Bin)

The Day-Lit SB, also known as a SPAR (Soil Plant Atmosphere Research) chamber, combines natural sunlight illumination with a sufficiently sized soil bin to allow study of soil and root processes. With one cubic meter of soil volume they are useful to investigate root growth and water use under conditions more similar to natural environments. The Plexiglas cap mounted on top of the soil bin provides for over 272 ft³ of volume for your plants as well as two trap doors for easy access to plants and soil for research and watering.

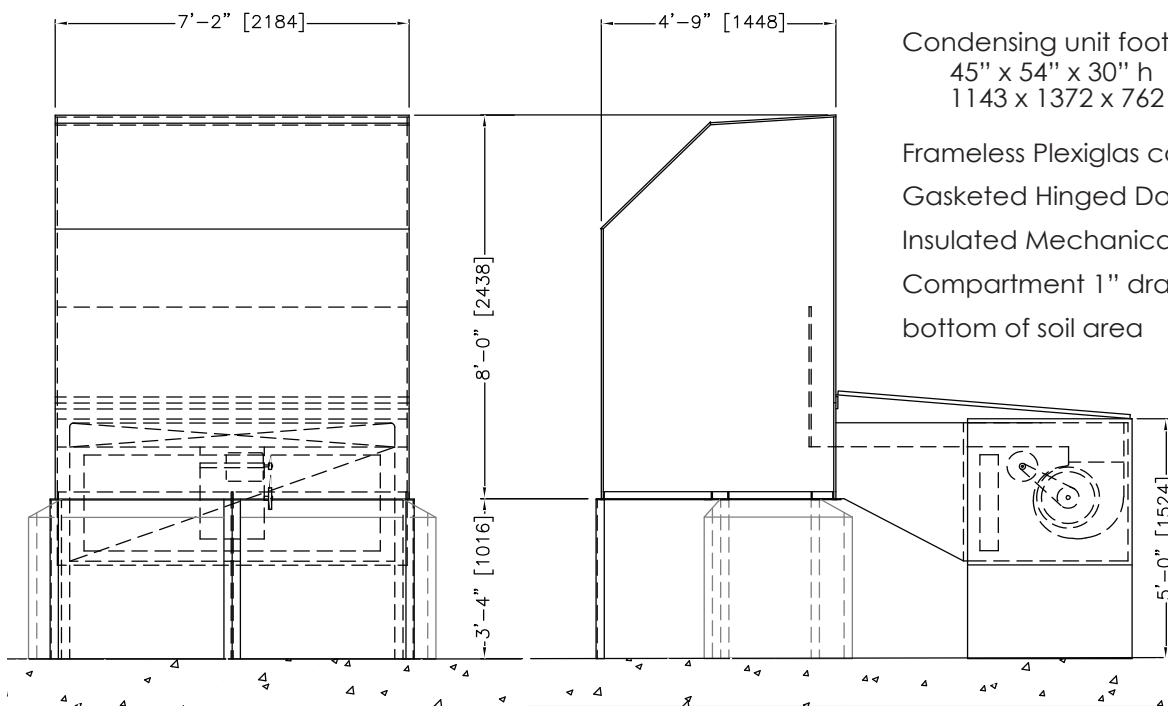
The Day-Lit SB is oriented with the front side facing south, and the mechanical unit behind it on the north side. Conditioned air is supplied by the distribution plenum to the top of the growth area and then flows downward over the plants and is collected just above the soil surface.

Over all exterior dimensions:
99" w X 130" d X 136" h
2515 X 3302 X 3454

Plexiglass case dimensions:
57" w X 86" d X 96" h
1448 X 2184 X 2438

Condensing unit footprint:
45" x 54" x 30" h
1143 x 1372 x 762

Frameless Plexiglas construction
Gasketed Hinged Door
Insulated Mechanical
Compartment 1" drain stub at
bottom of soil area



DAY-LIT SC (Soil Column)

The Day-Lit SC is an extension of the soil bin design concept, designed to accommodate a full-sized lysimeter. The Plexiglas cap and mechanical package are mounted above ground while the soil column lysimeter and related equipment are located in a small below ground compartment. The Plexiglas cap is similar in size to the Day-Lit SB, but other dimensions may vary depending on the project.



Large Volume Air Sampler with Microprocessor Control

The L60iF is a Large Volume Air Sampler with an integrated flow monitoring system. Developed from the basic L60 Air Sampler, the L60iF incorporates microprocessor control and flow monitoring to provide additional functionality.

The L60iF is suitable for all applications — from brief samples (100 litres in 100 seconds) to long term monitoring (3000 m³ in 30 days). A supervisor can programme a sampling schedule that can be initiated on site at the push of a button.

The sample volume and run times are stored in memory for verification. Should a flow interruption occur, the unit will display and sound an alarm, record the event and stop sampling. When power is restored after an interruption the sample will resume the program if the event meets criteria specified by the supervisor.

The L60iF represents an unbeatable combination of price, quality and reliability. They will run continuously for more than a year with only filter changes required. Applications include perimeter monitoring, emergency response, stack emissions sampling, routine workplace measurements and re-assurance monitoring. Many hundreds of these samplers are used in and around nuclear facilities throughout the world. They are also well-suited to monitoring airborne asbestos.



Nominal Flow Rate	>60 L/MIN
Memory	Volume to 9999 m ³ , Time to 9999 hours, Last 250 Sampling Programmes
Display	Vacuum Fluorescent
Flow Loss Alarm	Audible & Visual
Accuracy	Flow $\pm 2.5\%$, Volume $\pm 3\%$
Sliding Vane Pump	4 Vanes
Power Supply	110V 50Hz or 240V 50Hz
Motor Protection	Overload cutout trip
Dimensions	175 mm (H) X 290 mm (W) X 310 mm (D)
Weight	13.9 KG
Enclosure	Steel, Powder Coated

Equipment Maintenance

- Inspection should be performed at regular interval, as per environment condition & usage. After that, perform preventive maintenance on a regular basis. Depending upon conditions found during your initial inspection you can determine the intervals at which maintenance checks should be performed.
- The single most important item to check on your Percival chamber is airflow. Air is drawn through the condenser to cool the refrigerant. On an air-cooled condensing unit, the condenser is at the top right hand side of the chamber. Our series 36, 41, and 66 models have a perforated panel with the letter "P". On our series 30 models the panel is at the bottom. The condenser coil is behind the panel. This is where most of the dust and debris collects. Percival recommends using a vacuum to remove it.
- When checking air flow on your Percival chamber, also check the operation of the fan. Place a piece of paper in front of the condenser. The paper should be drawn into the condenser. If it is not, turn the chamber off to prevent damage.
- Another place to check airflow is the evaporator motor which is inside the chamber at the top or at the rear panel. This is a finned coil similar to the air-cooled condenser. Check for dust and debris here also. Use a flashlight to see behind the motor and inspect the evaporator. If cleaning is required, remove the fan panel. Again, use a vacuum to remove dirt. You can check the fan operation in the same way you checked the condenser coil.
- Other items to check regularly on your Percival chamber:
 - Ensure that all lights work
 - Check cumulative lamp lifetime.
 - Check chamber temperature operation. Set temperature to a low setting with lights ON (about 12°C) and see if it maintains for at least an hour. Do the same at a higher temperature, around 35°C.
 - Check power cords for frayed wires.
 - Check for unusual noises, i.e. whistling, rattling etc.
 - Check for unusual odors, i.e. "hot" smell, plastic or rubber burning etc.
 - Check temperature and relative humidity (RH) calibration. If you have a calibrated independent sensor adjust the offsets if necessary. Refer to the owner's manual for instructions.
 - Ensure the condensate drain line is clear. Flush obstructions with soap and water.
 - Most chambers have the drain line running along the back wall.
- **Cleaning Is Part of Maintenance**
- Cleaning the chamber is important to prevent mold, mildew, algae and bacteria. Approved cleaners are liquid soap, detergent and warm water, Lysol®, Pine Sol®, diluted isopropyl alcohol, and diluted bleach. Never use harsh or abrasive chemicals or acid base materials.
- If you have a pan type humidifier, it can be removed for cleaning.
- If mold or bacteria growth persists after cleaning, the growth is probably inside the evaporator or in an inaccessible spot. Removal of the evaporator pan is necessary to disinfect the evaporator coil. Some customers have had success by adding diluted bleach to the humidifier pan and setting the temperature and RH levels high (around 85% at 30°C – 40°C) for up to 6 hours. This allows the bleach water to get into the evaporator and other places that can't be reached. This method also works with an algicide.
- If you don't have a pan type humidifier or yours is behind the evaporator you can place a large shallow pan with bleach water and run at a higher temperature to allow the bleach water to evaporate and circulate throughout the chamber.
- Thank you for choosing Percival Scientific chambers and incubators. For additional assistance on the care and cleaning of your Percival products, please contact us.
- Temperature safety limit should be checked and adjusted as per need.

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