

Controlled Environment Systems Research Facility Guelph BlueBox System SEC9

Initially developed for low pressure studies of plant growth for space applications, the SEC9 growing system consists of 9 individually controlled circular growth chambers capable of operating from ambient pressure to a full vacuum. Their primary function is the short-term (days) quantification of plant photosynthetic response to a variety of environment variables (side bar). These growth chambers are an integral part of the CESRF hardware collection used to study of plant growth and development, photosynthetic gas exchange, air quality, and hydroponic solution remediation technologies under atmospheric conditions common to both Earth-based studies and extraterrestrial exploration and habitation.

Technical Specifications

- 1600 Watt water-cooled multispectral and programmable LED lighting system with available UV (368nm), blue (440 and 460nm), cyan (490nm), green (568nm), red (630 and 660nm) and far red (735nm) irradiation
- Carbon dioxide enrichment from 0 – 10,000 ppm
- Continuous CO₂ (0-20,000ppm) data recording
- Temperature control range from 15°C - 35°C +/- 0.5°C
- VPD control from 0.2 - 1.5 kPa
- Variable speed air flow with bottom up distribution
- Integrated Argus Control System - full data graphing and recording of all sensors and actuators
- Made of primarily non-off gassing inert materials
- 1600 x 450 mm (HxD) growing volume can accommodate a wide variety of crops
- Ability to custom blend the amount of CO₂, nitrogen and oxygen
- Vacuum ports available for custom system modifications depending on the experimental protocols required
- Off-line LED cooling system that runs independent of building chilled water supply

Environment control

Temperature
Humidity
Carbon dioxide
Oxygen
Light
Nutrients
Plant water status
Air pressure

