

# SmartNotes

# Q A

**As a geneticist, I am often developing new plant mutations and need to be able to regulate an external environment inside a stability chamber to closely monitor their growth. What type of bulbs can mimic day and night cycles?**

For plant growth it's critical to use bulbs that provide the ideal light emission. You need bulbs that are high in red and blue radiation, which provide good growth conditions for plants, e.g. flouora bulbs created by OSRAM, as are used in the Thermo Scientific™ 3900 Series Environmental Chambers. As plants depend on night and day patterns it's just as important to be able to gently simulate these cycles. Look for chamber options that can be programmed to simulate all phases including dusk and dawn.

Beyond the bulbs, it's also important to ensure the chamber stays within the ideal growth conditions. For a very common plant used in genetics research, *Arabidopsis Thaliana*, the ideal conditions are typically around 22 degrees Celsius and 60 to 70 percent relative humidity. The option to program different environmental conditions is also beneficial, such as temperature fluctuations and longer and shorter day cycles, similar to conditions experienced in nature throughout the year.



## How can I maximize my air flow while using an environmental chamber?

### Ideal Air Circulation with Horizontal Airflow Systems

#### Advantages of a directed horizontal laminar airflow system

A horizontal laminar airflow system includes a positive pressure feed plenum on one side of the chamber and a negative pressure return plenum on the left. This helps distribute the airflow uniformly throughout the chamber, directing air across the surface of each solid shelf. Even when filled with samples or equipment, each shelf receives a consistent flow of conditioned air for optimum temperature uniformity and recovery.

#### Concerns when using traditional non-directed airflow systems

As opposed to our horizontal airflow system, top-to-bottom (non-directed) airflow systems use a top-mounted fan to push air down through wire shelves. Temperature uniformity and recovery can deteriorate quickly when shelves are filled because air movement is blocked. The variation in temperature, alone or when combined with frequent door openings, may compromise environmental conditions or make process validation difficult.



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