

Case study: Delta Tree Nursery

Overview

Delta Tree Nursery approached Cleanrooms Australia to design and construct a quarantine cleanroom facility for the growth of plant tissue cultures. The cleanroom needs to continuously operate 24 hours per day for a period of two years and is housed in a new purpose-built facility.



Background

Delta Tree Nursery specialises in supplying high quality trees to small- and large-scale orchards. The company produces high-quality clonal nut varieties in its state-of-the-art tissue culture laboratory in Bunbartha in rural Victoria.

Delta Tree approached Cleanrooms Australia to design and build a quarantine facility for its Bunbartha operation. The facility needed to be contained within a containment facility in order to prevent the escape of bacteria, spores or other infections that would compromise the external environment, whilst safely containing and growing the tissue cultures and protecting them from adverse environmental impact.

The project started with conflicting compliance requirements as there were multiple stakeholders and authorities having input over the performance requirements, the project was halted while the client sought clarification and work through the detail of what the final requirements would be.

Either

ISO 14644 class eight clean area with some refrigeration and no humidity control

or

ISO 14644 class seven clean area with HEPA filters with limited refrigeration and humidity control.

Cleanrooms Australia was also notified during this process that the client had employed a third-party consulting company to validate that the cleanroom satisfied stated specifications on delivery. This was welcomed by cleanrooms Australia as it indicated that the client understood and was taking seriously the difference stakeholders requirements and final specification needs at the beginning of the project.

This caused a design halt as Cleanrooms Australia took steps to clarify the correct ISO classification and the subsequent specifications required.

The solution

To bring clarity to Delta Tree's cleanroom requirements, we requested a user requirement specification (URS) from the client, along with confirmation from the end certifying company that the requirements listed in the URS would be compliant with the standard they would be testing to.

This allowed us to get the project back on track, and start work on the cleanroom construction. The cleanroom was to be a simple insulated container with windows, however also required filters on all grills, outlets and other openings to ensure that any bugs in the plant tissue culture would be contained inside the cleanroom.



The critical factors

Delta Tree required that the cleanroom facility run continuously for 24 hours per day for a period of two years. This meant that the cleanroom would need to be equipped with (redundancy systems) back-up on refrigeration (air conditioning) supply air systems and exhaust systems.

The design also needed to exclusively utilise equipment that is available off the shelf in Australia to facilitate the prompt provision and replacement of any replacement parts that may be required in the event of an equipment failure in any of the primary or back-up systems.

As the cleanroom was to only be under intermittent supervision by the on-site manager, the client also required the inclusion of control devices with an automated notification (alarm) system that would alert the manager of any changes (excursions) to temperature or pressure status via a digital output on the controls device.

We also needed to design and install a visual alarm light system in the cleanroom that the on-site manager would be able to easily use to identify any problems so he could manually change between systems as needed.

The process

During the design process, Cleanrooms Australia discovered the client originally planned to have the cleanroom container standing alone in a paddock at their Bunbartha property.

However, on our advice, Delta Tree opted to place the container on a cement slab in order to prevent condensation build-up under the steel base that would shorten the life of the cleanroom.

We also advised that the cleanroom roof and central equipment should be protected from potential rain damage due its vulnerable placement in a paddock that would be open to the elements.

The results

As a result of our advice, Delta Tree opted to incorporate the specially constructed cleanroom facility in conjunction with a purpose-built structure to house the cleanroom in addition to the male and female amenities, first-aid facilities, uniform stores and crib rooms for their entire facility. This created a personal product flow synergy whilst utilising the benefits of technical design and construction off-site without the cost of transporting technical trades to the construction site.

Delta Tree recently took delivery of the cleanroom. It met the required ISO standards and is currently in operation at their Bunbartha facility.

Conclusion

Cleanrooms Australia successfully solved initial client confusion to design and constructed an ISO-certified cleanroom for Delta Tree's Bunbartha facility. It has been designed to continuously operate 24 hours per day for a period of two years with back-up air conditioning and exhaust systems. It also features an automated notification system with manual controls to ensure the on-site manager can switch between primary and backup systems as needed.