

CLEANCUBE MAXI 7 CL2 LAB



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THE CLIENT

A leading global Biopharmaceutical company. Across their work in R&D, manufacturing and their commercial business, the client are inspired by what science can do and are on a mission to deliver life-changing medicines, transform population health outcomes and, ultimately, accelerate the UK as a global leader in Life Sciences.



Research & Development



21+/-3C – 40+/-20% RH



210m²



THE BRIEF

The client required additional process space to upscale Research & Development into new environmentally conscious Vaccine & Immune Therapy practices.



“A fantastic install we’ll learn from...”

Guardtech Group Commercial Director Mark Wheeler said: “This was a challenging project for a global leader in their field and it pushed our teams to be at their innovative best. “We had to be very flexible to ensure the client’s fluid requirements were met. Developing the HVAC system required some serious malleability on our part, but the Design and Install Teams overcame every hurdle. “The combination of the fire-rating issues along with the restrictions of the modules obviously caused a string of challenges, but the Cleancube team refused to allow anything to stop them from producing a world-class controlled environment.”

Mark Wheeler
Guardtech Group
Commercial Director



cleancube
mobile cleanrooms

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GT Shell official panel system partner:



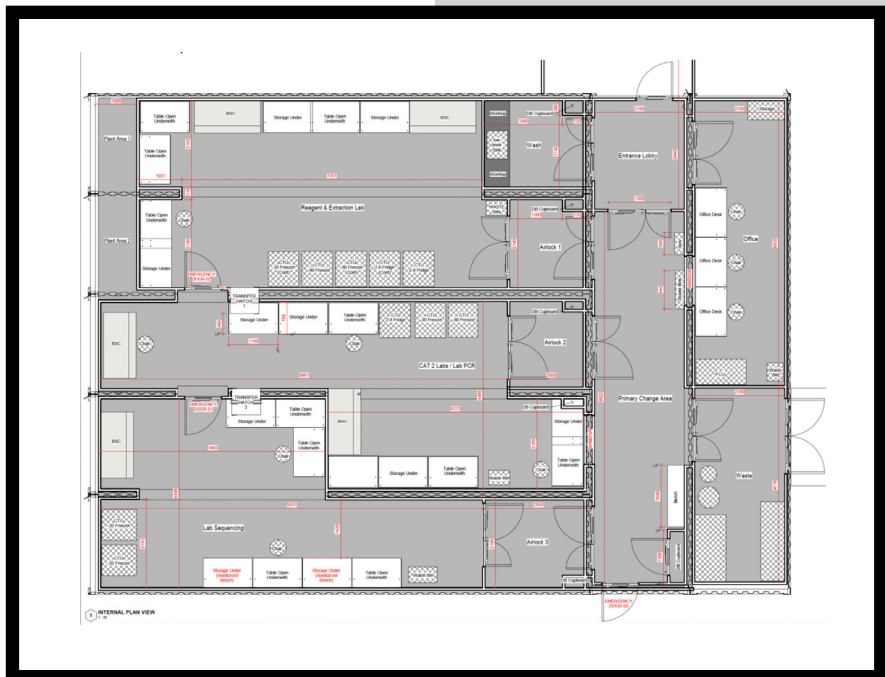
Partner

THE TECH SPECS

A controlled environment designed, installed, cleaned and commissioned by Guardtech built to the following specification:

◆ **Structural:** GT Access Plus semi-flush single doors, GT Access Lite powder-coated steel double doors, GT Access Plus Hospital doors, GT Shell Pro semi-flush de-ended wall panel system, GT Lid Pro de-ended ceiling panel system, GT Vision Plus 900mm x 900mm fish tank double glazed units, GT Deck Plus flooring with pre-formed cove, wall to floor, laid under vinyl, 100mm FFL to underside of panel face.

◆ **Electrical:** GT Lux Plus 1,200mm x 600mm recessed LED luminaires delivering 500 lux as standard, electromagnetic interlocks and status indicators, emergency break glass, traffic lights, 13amp double sockets in three-compartment dado trunking, CAT6 data sockets in 3-compartment dado trunking, 6-way distribution boards & 6-way network switches, 18-way distribution board, smoke detection heads.



◆ **Mechanical:** GT Air Pro bespoke Air Handling Unit (AHU), with integrated dual F7 bag & pleated filters, heat recovery unit with controls and ductwork to F7 bag filters – providing 15 air changes per hour, extraction fan & ductwork including 10 x container wall penetrations, forced exhaust from negative pressure process rooms.

◆ **Monitoring:** GT Scan Pro Environmental Monitoring System (EMS) measuring temperature, humidity and pressure via wall-mounted transmitters, with data fed back to Tridium Niagara Controller with Unitronics 7" HMI Touchscreen console installed on the face of the controls cabinet.

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◆ **Furniture & Equipment:** Grade 304 stainless steel hand wash sink with point of use water heater, grade 304 stainless steel waste bin, grade 304 stainless steel dispensers, Trespa work surface utility sink with point of use water heater, grade 304 stainless steel transfer hatch with mechanical interlock, stainless steel seating bench, mirror, lockers, dispenser, waste bin.

THE CHALLENGES

HVAC changes: The HVAC system was redeveloped a number of times on this project. The final Air Handling Unit (AHU) design now includes chilled water coils to accommodate a chilled water supply. The target was to achieve a HVAC system suitable for our laboratories which utilises gasses of low global warming practices (GWP).

A typical R32 system has a GWP rating of 675. An R454B refrigerant (GWP rating of 466) was also reviewed but wasn't possible. We therefore ended up using a complex and intricate 90kW chiller system complete with R290 refrigerant (GWP rating of 3), associated buffer tank

and pump set to achieve the conditions the client required for their process. The AHU also features two supply fans which automatically change over every week in order to prolong the lifespan of the AHU. Another neat innovation that shows ongoing sustainability is at the forefront of our design considerations.

Bespoke ductwork: This particular Cleancube Maxi 7 needed to have a 2.3m internal ceiling height. As a result, it featured a bespoke 'super slimline' ductwork system that had to be fitted at the same time as the ceiling panels. The Cleancube Installation Team had to demonstrate a high level of technical skill and creativity to ensure all the specially engineered ducting fitted into place, whilst allowing room for electrics and services to run along inside the top of the container.

Container Tetris: This was the first time a bespoke Cleancube design arrangement had tasked the team with joining the width of a container across a row of container ends. Because of this, team had to utilise our Jackpad system on a single container, rather than all of the containers in the total Maxi footprint – which is usually the case. A 20ml gap was created – and so in

order to keep the containers level, the Installation Team had to utilise all their positioning knowhow to ensure all the container connections were seamless.

"This was certainly a great learning curve," said Manufacturing Manager Michael Burton. "Each time we try a new innovation or encounter something different, it just makes the next system stronger and our practices more efficient."

As well as this, the client changed their mind several times on how they wanted to position the Cleancube, which led to some delicate and considered manoeuvring from the team and crane operators. But, as ever, we were up to the challenge and overcame any difficulties.

Fire rating: Our work on this Maxi system led to some exciting new innovations in terms of the different ways we can ensure the containers are fire rated moving forward. Previously, we've tended to utilise fire-rated panels, but a combination of factors caused a major challenge with this project: the aforementioned restricted internal ceiling height and inclusion of bespoke ductwork, as well as the fact that fire-rated panels tend to be 80-100ml as standard.

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As a result, the void space was too tight to include the fire-rated panel system, so the team devised a method of fire rating the inside of the container walls and adding extra welding on the top of the containers to make them flat. The team then introduced fire-rated panels on top of that and flashed the edges to meet those stringent, yet vital, fire-rating requirements.

Keeping it trim: A common theme with this Maxi 7 is the fact it boasts a number of bespoke innovations – and this also included the trim heaters utilised in the HVAC system. Again, this was a knock-on effect of the restricted void space. The heaters needed to be kept away from the actual heating elements, so specially engineered units were manufactured to ensure they all fit in the available space that could be utilised at the top end of the modules.

Data difficulty: The

client required CAT6 connectivity to ensure all of the fridges used in the facility could feed back critical temperature data from thermostat probes to a central Environmental Monitoring System (EMS). The challenge for the Cleancube team

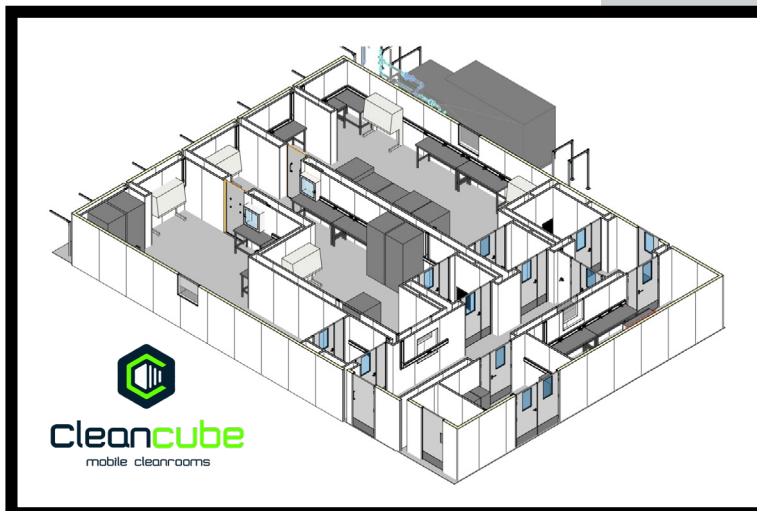
was to ensure the strength of the data connection remained consistently good throughout the Cleancube. The team created an intelligent hatch system that eliminated unwanted joins and ensured single cables were fed back through the opposite direction of the containers to reduce the number of cables that were required.

Keep it tight: The flooring system also needed to be fire rated, adding yet another challenge to retaining the desired internal ceiling height.

Ensuring the flooring system was as flush as possible required a level of skill and expertise that the Cleancube team have honed over a number of years. As Installation Manager

Burton described it: "Everything just kept closing in on us!"

The team also fitted bespoke lighting panel units to ensure the LEDs could be accessed from roomside (again, due to that limited void space) via an intelligently engineered clip system.



was that the plant room was at one end of the facility, while the fridges were placed in a number of process rooms across the footprint. In total, there were around 150 data points required in the unit.

As a result, the team had to find

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THE RESULT

Guardtech Group Commercial Director Mark Wheeler said: "This was a challenging project for a global leader in their field and it pushed our teams to be at their innovative best.

"We had to be very flexible to ensure the client's fluid requirements were met. Developing the HVAC system required some serious malleability on our part, but the Design and Install Teams

overcame every hurdle.

"The combination of the fire-rating issues along with the restrictions of the modules obviously caused a string of challenges, but the Cleancube team refused to allow anything to stop them from producing a world-class controlled environment. I'd like to pay tribute to the whole team for their tireless efforts in completing a fantastic installation from which we'll learn a great deal to make our award-winning container facilities even better."

