



Preventing condensation
for world-leading
electron cryo-microscopy

Medical Research Council, England



Preventing condensation and controlling relative humidity (RH) levels for world leading electron cryo-microscopy at the Medical Research Council Laboratory of Molecular Biology.

The Medical Research Council (MRC) improves the health of people around the world by supporting excellent science, and training the best scientists. The MRC Laboratory of Molecular Biology (MRC LMB) is a world-class laboratory that is dedicated to understanding important biological processes to help tackle major problems in human health and disease. Over the years, the MRC LMB has attracted 12 nobel prizes, as well as dozens of scientific awards and honours in molecular biology. (Source: MRC LMB).

Within the MRC LMB lies several cryo-laboratories, along with a world leading, electron cryo-microscope - a multi-million pound investment that is used for carrying out critical research into human health and disease.

For more than a decade, Munters has supplied and maintained dehumidifiers that are essential for the effective operation of this microscope.

Case study

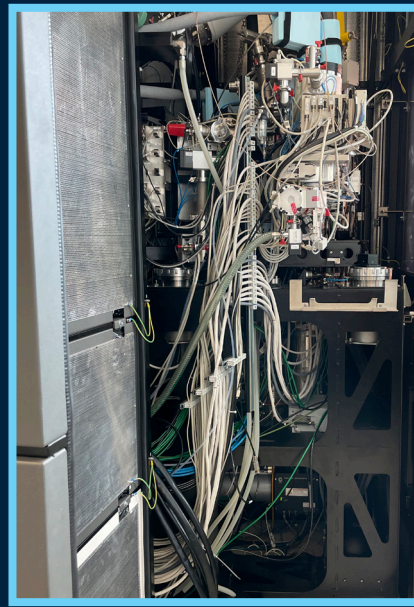
Prevent condensation and protect critical research at Medical Research Council Laboratory of Molecular Biology.

Advantages:

- Prevent condensation causing damage to research samples and multi-million pound electron cryo-microscope
- Deliver bespoke temperature and humidity control systems in modular format to enable installation where space and access is restricted



*The exterior
and interior
of the electron
cryo-microscope*



Condensation control

The idea of electron cryo-microscopy was conceived over 30 years before the technology existed. Today, scientists can carry out their research using world-leading equipment.

The electron cryo-microscope is an incredible invention. Research specimens are submerged into liquid ethane at -193°C . This process freezes them so quickly that it creates a glass, or water glass, which enhances the clarity of the molecules within the specimens.

“In this instance, water is both the friend and the enemy” says Dr Chris Russo, MRC LMB group leader. “When submerging research samples into the ethane at liquid nitrogen temperatures, it is absolutely critical that other moisture is minimised, otherwise the sample could be ruined.”

And it’s for this reason that dehumidification is so crucial. “Without dehumidification, even the slightest amount of excess moisture will cause ice to build on the specimens. This is a fundamental barrier to producing quality electron microscopic images. If the resolution is poor, we won’t get the image and won’t solve what we need to”.

The microscope itself is also susceptible to moisture damage. Strong electrodes and iron magnets can corrode and decay if relative humidity is not effectively controlled within the cryo-laboratories.



The systems needed to be built in a custom, modular format and assembled on site due to space restrictions.



The Munters ML plus systems are suspended from the ceiling to prevent vibration to the laboratories below.

Solution

Munters has supplied several ML plus temperature and humidity control systems to maintain a temperature of 20°C at 20% relative humidity. These systems incorporate desiccant dehumidifiers, cooling coils, booster fans and filtration. The ML Plus systems are connected to BMS (Building Management System) so the MRC LMB have visibility of the equipments' performance, and the ability to change the humidity set point if required.

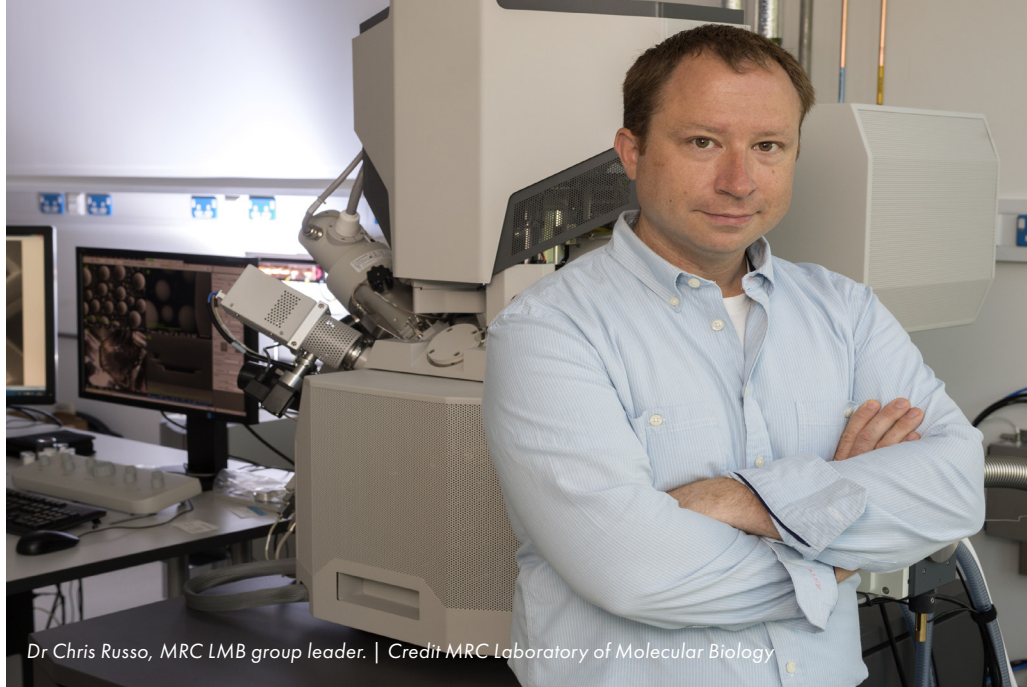
Unusually, the plant room where the dehumidifiers are installed is situated above the laboratories on a floating plant room floor. This is critical for preventing any vibration in the laboratories below. Munters worked closely with MRC LMB and building contractors to meet these needs.

The temperature and humidity control systems were uniquely designed so that they could be broken down into modules, enabling them to fit through small gaps and past existing plant equipment, after which they were reassembled as ML plus systems in their install location.

Dr Russo continues "Using the microscope would be extremely problematic if there was no dehumidification. These specialist microscopes cost millions of pounds to purchase (from funding), and thousands of pounds per day to operate. Other laboratories look to the MRC LMB to learn not only how we operate our microscope, but also how to build our rooms and the facility. The Munters dehumidifiers are big part of that.



Specimens for scientific research



Dr Chris Russo, MRC LMB group leader. | Credit MRC Laboratory of Molecular Biology

Choosing Munters

Dr Stephen Holmes, head of estates and capital projects at the MRC LMB states. "Munters really understands our needs. The dehumidifiers work extremely well and are very robust. For over 10 years, our relationship has continued to grow. We have had great continuity from your service team, who work with us to offer advice and technical support as well as delivering excellent maintenance support."

The MRC LMB is committed to their targets of achieving net zero by 2040, and halving carbon emissions by 2050, and Munters is committed to ensuring dehumidification supports this journey.

Dr Holmes continues "It's important that we become more sustainable. In our quest to net zero, we need to look at how we operate. With dehumidification we need to understand ways to reduce energy consumption. We are confident that, in working together with Munters, we will be able to achieve our goals."

Would you like to find out if Munters has a solution for your company too? If so, please visit our website, www.munters.com

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