Munters

Case study - Revisited

University of Birmingham

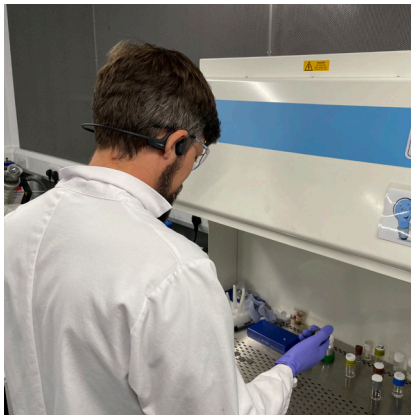
Battery dry room

In 2019, the University of Birmingham's Metallurgy & Materials building welcomed the installation of Munters' turnkey battery dry room. Fast forward four years, and we returned to the university to learn about the dry room's performance and their collaboration with Munters. This visit was kindly hosted by Ben Pye, Research Technician, and Dr. David Burnett, Research Fellow, who guided us through the facility.

Since the dry room's installation and commissioning, the team has expanded from approximately 9 individuals to a workforce of around 30. Their projects encompass a variety of activities with roughly one-third requiring dry air. Within the battery dry room, they conduct research on materials including cathodes, lithium, emerging technologies like sodium, and battery recycling. These projects originate from both industry sources and renowned organizations such as the Faraday Institute and Innovate UK. The use of alternative solutions, like glove boxes, proved ineffective for their testing requirements, highlighting the critical role played by the dry room.

Dr. David Burnett is a research fellow in the Energy Materials Group and has worked on a range of projects including high voltage cathode materials, and full cell design and testing. He helps supervise the materials development work and is lab manager for the dry room. He agrees that the dry room has made a significant positive impact upon the research undertaken at the University of Birmingham and the facility is of excellent quality.

Question & Answer



Working in the dry room.

Can you tell us about your research?

Our research revolves around moisture-sensitive materials, specifically cathodes and lithium and other moisture sensitive materials. The ultra-low dewpoint conditions in the dry room allow us to work with lithium in an open-air environment. This is possible because the low moisture content prevents oxidation or tarnishing of the material before it can be utilised in a cell. Other institutions rely on glove boxes, but these are less suitable due to the small size of the materials. On an average week, the University accommodates three undergraduates working on post-doctoral projects in the room alongside these research activities.

Inside the dry room.

How do you find the functionality of the room?

“In terms of functionality, it works very well,” says Ben. He acknowledges that there have been occasional challenges related to static, but Jason provided valuable suggestions that they have taken onboard. Dr. Burnett emphasised that the room is highly regarded by its users.

The room is designed to operate at -40 dew point at a temperature of 20°C. Ben explains that they run the room slightly lower than the -40 dew point target to offer a bit of flexibility. “We have people coming in and out so we like to have it slightly lower so there’s a bit more of a cushion.” Jason proceeded to discuss the differences in occupancy, the impact of the number of people in the room, as well as implications and factors that need to be considered if they were to go to -50 or even lower in the future.

The Munters desiccant dehumidification system installed in the plant room.

What has your experience been like working with Munters Service?

Overall, our experience has been very positive, notes Ben. The Munters team is highly responsive and provides continuity by assigning familiar engineers to our projects. Any concerns that have arisen were promptly addressed, usually within 48 hours or less. Ben also shared a situation where the Munters team went above and beyond to resolve an issue unrelated to the dehumidifier's performance, specifically concerning the gas supply.

Air is supplied through the wall.

How has the dry room been performing?

The battery dry room has a unique L-shaped design, necessitated by the presence of immovable pillars due to the building's Grade 2 listed status. Munters dedicated significant effort during the design phase to optimise the room's airflow distribution. The computational fluid dynamics (CFD) modelling conducted by Munters for the University of Birmingham is now part of their presentation materials due to its accuracy and relevance to both research and production. During each service visit, airflows can be checked and balanced to ensure optimal performance.

"As with all systems, learning how to use them effectively is paramount," explains Ben. "We have developed procedures for fire alarm testing and its impact on power supply, as optimal usability is critical when working with very light and small materials that can easily escape to the floor."

Could anything be improved?

"Well, we'd always welcome more space!" they quipped. And while expanding the physical size of the room may not be feasible, Munters remains committed to supporting their endeavours now and in the future.

Jason Bettles, Munters Business Development Manager, says:

"It's been a pleasure returning to the battery dry room at the University of Birmingham and learning about its pivotal role in supporting battery research.

At Munters, we are committed to long-term partnerships with our customers, and understanding how the battery dry room is utilized is essential to providing effective support in the future.

We've gained valuable insights and discussed ways to address minor user challenges, further enhancing the room."

Special thanks to Professor Emma Kendrick, group lead of the Energy Materials Group, for allowing this visit, and to Ben and David for taking the time to show the team around.

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

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