Automated Battery Manufacturing Systems

Specialist technology for cell assembly and quality control

CELLERATE

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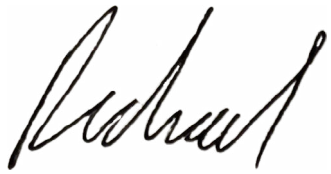
Shaping the future of energy storage, one cell at a time.

WELCOME TO CELLERATE

At Cellerate, we've always believed in pushing the boundaries of what's possible in battery technology. Our commitment to innovation and excellence has driven us to work alongside some of the leading battery research and production companies in the world. Together, we believe that we are shaping the future of energy storage, one cell at a time.

This document will give you an overview of what Cellerate offers and how our solutions can benefit you directly. Whether you want to transform your battery research capabilities, enhance your production processes, improve yield and reliability, or stay one step ahead in the fast-evolving battery landscape, we're here to support you at every step.

We look forward to the opportunity to work with you.



Richard Fields, Founder and MD

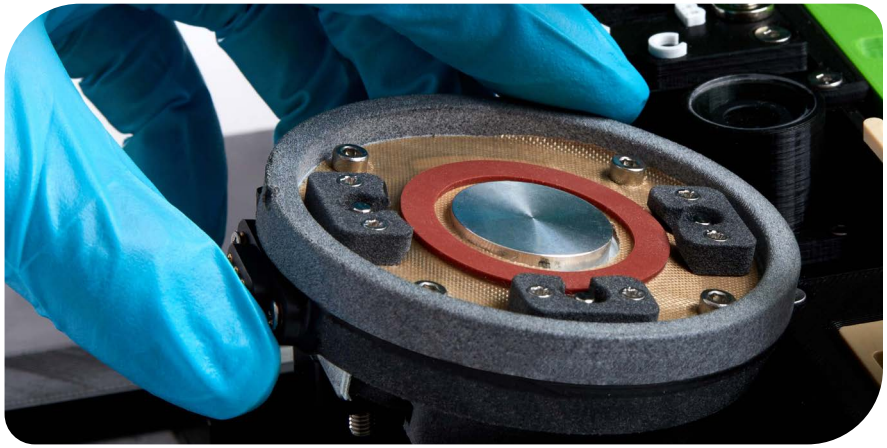
WHY | AUTOMATED BATTERY ASSEMBLY AND TESTING

The primary goal with automated assembly is to produce reliable battery cells that meet the stringent demands of today's industries. Automated systems ensure that every cell, whether coin or pouch, is manufactured to your exacting standards, providing consistent performance across all units.

Automated battery assembly and testing involves using advanced machinery and robotics to construct and test battery cells with minimal human intervention. By implementing this technology, you can improve the precision, speed, and consistency of your prototype production processes, while also freeing the time of your highly trained team.

Key benefits

- **Improve cell build quality and consistency**
- **Eliminate human error from production & testing**
- **Reallocate your skilled technicians to high-value tasks**
- **Convert your new technicians into battery experts**



Improved cell build quality and consistency

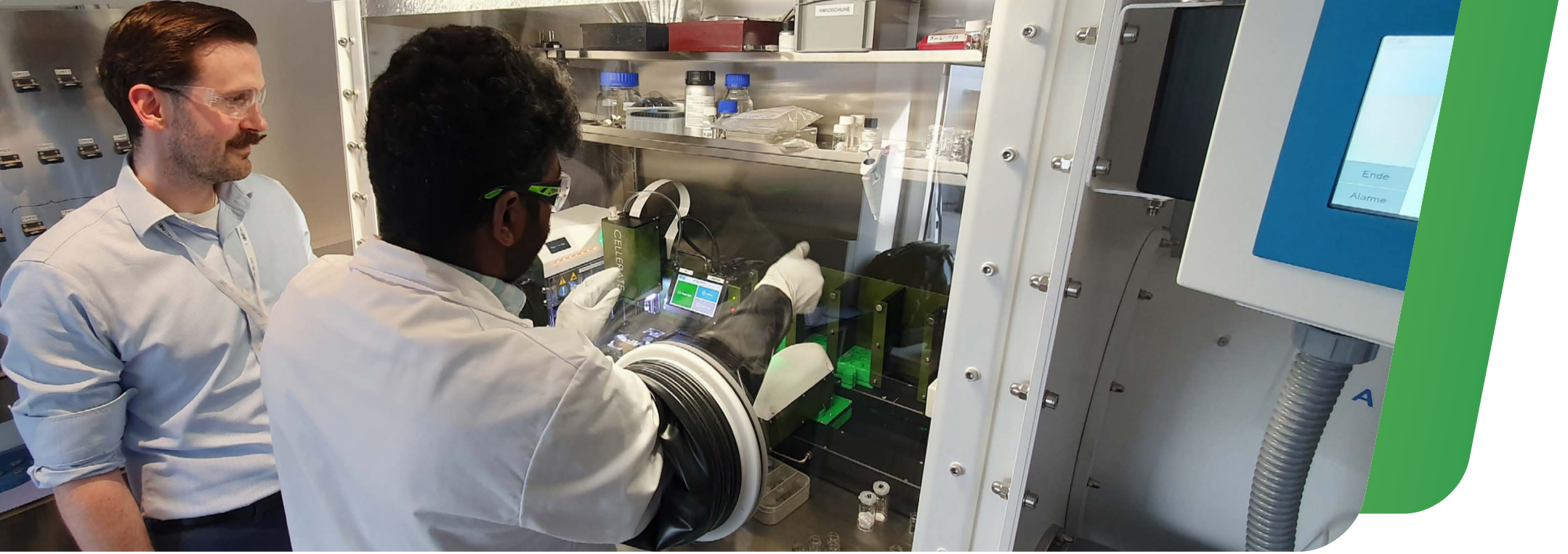
With automated battery assembly, you can achieve unparalleled accuracy and consistency. Automated systems are designed to maintain a typical variance of just 0.2% during the assembly process, a level of precision that is difficult to match with manual labour.

This consistency directly translates to higher yield rates, allowing you to produce more usable cells from each batch of materials. By ensuring that every battery cell meets strict specifications, you can guarantee both performance and safety, which is especially important in the production of coin and pouch cells.

Eliminate human error from production & testing

Even in controlled environments, human error can lead to inconsistencies in the production process, potentially causing defects, reduced efficiency, and lower product quality. By automating your battery assembly processes, you can significantly reduce or even eliminate the risk of human error, ensuring that each battery cell is produced to the highest standards.

A current Cellerate customer was confused when 50% of their latest batch failed to pass initial tests. Fortunately, the high-definition camera built in to the Assembler Module captures images for QC purposes at every single step. The image logs from the batch revealed that the lithium discs used with the cells had been “over-enthusiastically” polished by a new technician, which had caused them to deform. These, now over-sized, disks were making contact with the outer case, causing the cells to short-circuit. Without the Assembler Module, this small human error could have taken weeks to discover.



Reallocate your skilled staff to high-value tasks

By automating repetitive and precision-dependent tasks, such as the assembly and testing coin and pouch cells, you can free up your most skilled employees to focus on more critical, high-impact work. Instead of being tied to routine operations, your experienced staff can contribute to areas like quality control, process optimisation, and research and development. This strategic reallocation improves operational efficiency and drives innovation, ensuring that your company stays at the forefront of technological advancements.

Cellerate systems can operate autonomously, executing complex tasks precisely and consistently for extended periods. This capability reduces the need for constant oversight, enabling your skilled workforce to concentrate on more value-added functions during regular working hours. The ability to run the machine overnight further enhances productivity as it continues manufacturing and testing without interruption, effectively increasing your output while your labs are staff-free.

Convert your new, untrained technicians into battery experts overnight

Automation has the added benefit of converting your new, untrained technicians into proficient battery production and testing operators with practically no training. With a basic understanding of battery assembly techniques, your technicians only need to load the materials into the machine (with clear, step-by-step instructions provided on-screen), which will handle the rest of the process. The system takes over the picking, placing, electrolyte dispensing and sealing, ensuring precision and consistency while reducing the potential for human error.

With Cellerate systems, your team can focus on material handling and machine monitoring while the system manages the technical aspects. This setup reduces the learning curve for your technicians, allowing your operation to maintain efficiency and productivity from the start.

Cell Assembly & Sealing System

CASS | CELL ASSEMBLY AND SEALING SYSTEM

The Cell Assembly & Sealing System (CASS) is a fully automated bench-top machine that allows you to build coin cells and single-layer pouch cells quickly and precisely. Its small form factor allows it to fit through the antechamber of a two-glove glovebox easily, allowing it to be integrated into existing workflows without having to remove the glovebox window. It is ideal for research and quality assurance labs to develop and test battery technology to the highest standards.

CASS allows you to reliably assemble and test coin cells, our innovative Protocell, and single-layer pouch cells in batches of the same design or with controlled variation. This flexibility allows you to seamlessly transition from basic research to commercially relevant testing, all with a single machine. With training, technicians can switch between cell formats in under 5 minutes easily and without requiring specialist tools.

CASS solves several fundamental challenges that arise when developing and testing battery technology:

- **How do you remove human error?**
- **How can you make tests 100% repeatable every time?**
- **How can you introduce controlled variation to test the tolerances of cell production?**
- **How do you introduce complete (evidenced) quality control at every step of the production process?**
- **How do you speed up the entire process while solving these challenges?**

CASS | MODULAR BY DESIGN

The Cell Assembly and Sealing System (CASS) offers a modular battery production and testing approach. Designed for ease of scalability, CASS allows you to run small-scale and fully automated batch production operations.

You may start with the Sealing Module, which will allow you to reliably seal a range of coin and pouch batteries in a single, ultra-compact unit. However, the system's true capabilities commence when you take advantage of the Assembler Module, which uses machine assembly to produce identical cells every time. The addition of the Autoloader module allows you to significantly scale production, unlocking the capability to reliably produce up to 100 prototype cells, completely unattended.

CASS is comprised of the following core modules:

Sealer Module Assembler Module Autoloader Module

Fits easily within standard lab glovebox systems

Measuring a maximum size of 275mm x 570mm (or 330mm x 1,085mm with the Autoloader Module attached), CASS fits easily within all standard lab glovebox systems, each system module can be easily passed through the large antechamber and set up within the glovebox in under two hours. Its compact size allows you to handle all your electrolytes in a safe and secure environment while providing a inert environment for CASS to operate.

CASS | SEALER MODULE

The CASS Sealer Module can be operated in complete isolation from the other Modules, making it the perfect starting point if you are looking for a robust, reliable, and efficient cell and pouch sealing solution with a minimal footprint, with built in pump for pouch cell sealing and no compressed air supply requirement. Once coupled with the Assembler and Autoloader Modules, you can further benefit from a semi or fully automated cell assembly and sealing process.

A core design feature of the Module is the interchangeable dies, which allow you to seal coin cells, pouch cells and Protocell batteries and supercapacitors using the unit. A die change requires no specialist tools and typically takes only a matter of minutes to accomplish, allowing rapid technology scale-up from fundamental electrochemical research to applied industry relevant test cells.

Coin Cell Die

Protocell Die

Pouch Lamination Die

Pouch Sealing Die

- Seal coin cells, Protocells or pouches with the same unit
- Ultra-compact design, 301mm x 190mm, and 301mm in height
- Built-in display guides you through the sealing process
- Safety guarding and interlock system for protection
- No external compressed air supply required
- Mains powered, comes with KF-40 power feedthrough

CASS | ASSEMBLER MODULE

The CASS Assembler Module can transform your prototype coin and pouch cell production capabilities while reducing the overall time and skill levels required to achieve repeatable, high quality test cells.

At the Module's heart is a bespoke pick-and-place unit capable of precisely placing cell components, including curved electrodes, and dispensing exact volumes of electrolytes from the vials and the loading tray provided. As the entire process is computer controlled, each cell can either be identically produced one after another, or you can alter the cell build procedure for each, allowing you to explore electrolyte parameter space and experiment with different materials under a controlled and traceable procedure.

Machine vision electrode alignment

A patented, High Definition vision processing unit ensures that each electrode is correctly aligned before sealing.

Computer-controlled dispensing

Between 5-200 µL of electrolyte can be dispensed accurately every time, with multiple vials supported.

Automated Quality Control

Each coin cell or pouch produced is photographed at every stage, allowing you to review and QC every run.

Explore electrolyte parameter space

Program the system to utilise multiple vials to dispense electrolytes and additives in a controlled sequence.

Avoid cross-contamination

Heads are automatically exchanged based on the substance being deposited, preventing cross-contamination.

Auto-feed trays to the Sealer

Once assembled, cells are automatically fed from the Assembler to the Sealer Module.

- Produce up to 20 cells per hour, with <100 µm misalignment between electrodes
- Reduce cell assembly time by up to 95%
- Produce identical cells every single time, without error
- High-definition cameras log the build of every cell for QC and error tracking
- Large, built-in colour screen guides you through the process
- Lower the skill barrier to cell assembly
- Multiple vial system prevents cross-contamination

CASS | AUTOLOADER MODULE

The CASS Autoloader Module holds up to 100 coin or pouch cell trays in a secure holding area ready for transportation to the Assembly Module. Completed cells are returned to the autoloader for storage until the end of the specified build plan.

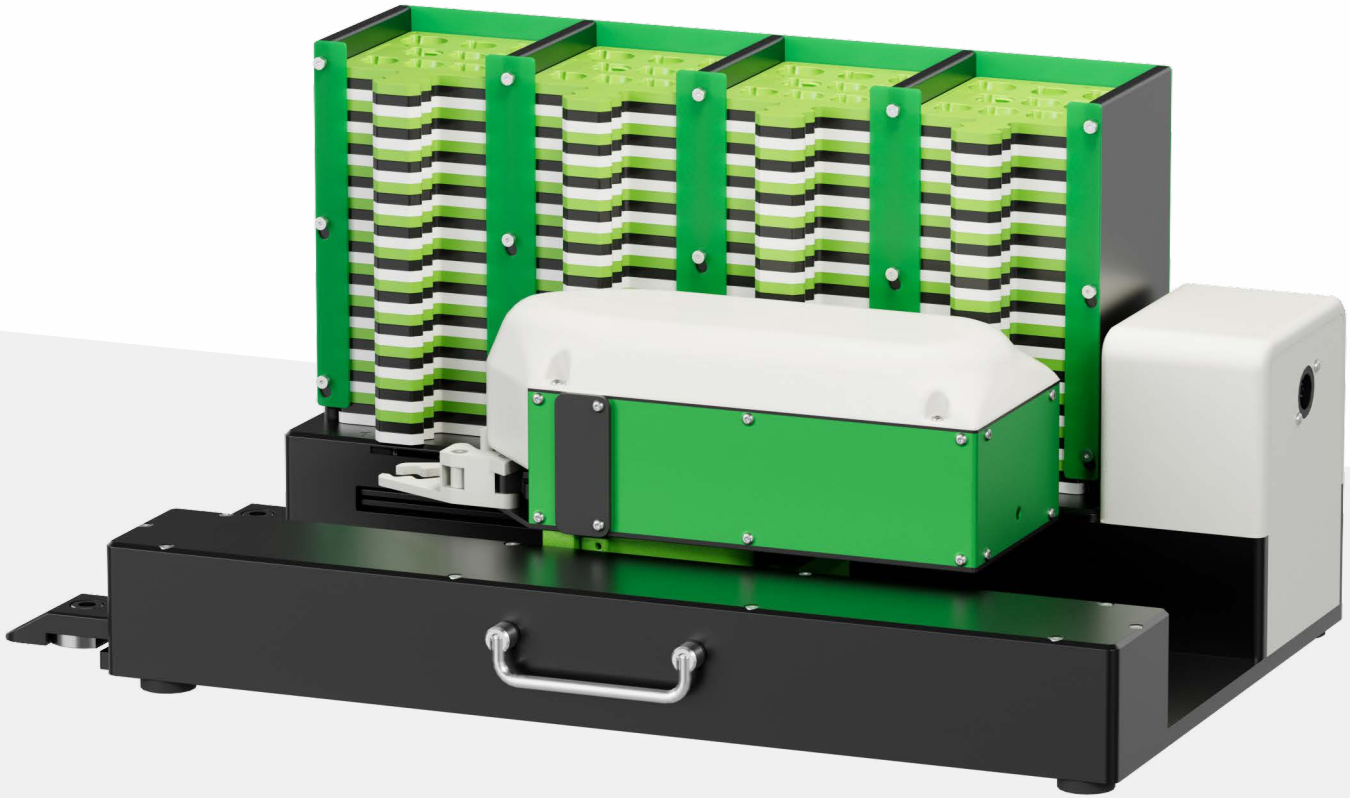
The Autoloader features a highly accurate and flexible robotic arm, which collects the next tray of cell components from the holding area before transporting it with care to the Assembler module for assembly.

This module allows you to scale up your automated cell assembly processes with minimal time investment. Filling the Autoloader Module to its 100-tray capacity typically requires a single hour of an entry level technicians time.

Interchangeable coin and pouch trays

The Assembler and Autoloader Modules work with interchangeable coin and pouch trays designed to accommodate a range of shapes and sizes, depending on your requirements. These trays allow you to produce and test an expansive range of prototype batteries, with customised trays being commonly made for handling electrodes of various sizes, and inclusion of multiple separators and spacers.

- Self-contained, robotic module
- Compatible with both coin and pouch cells
- Pre-prepare up to 100 unique trays ready for assembly
- Make every cell unique, if required, to explore parameter space
- Each cell is contained within its own tray to prevent contamination
- Total setup time of around 1 hour for 100 cells

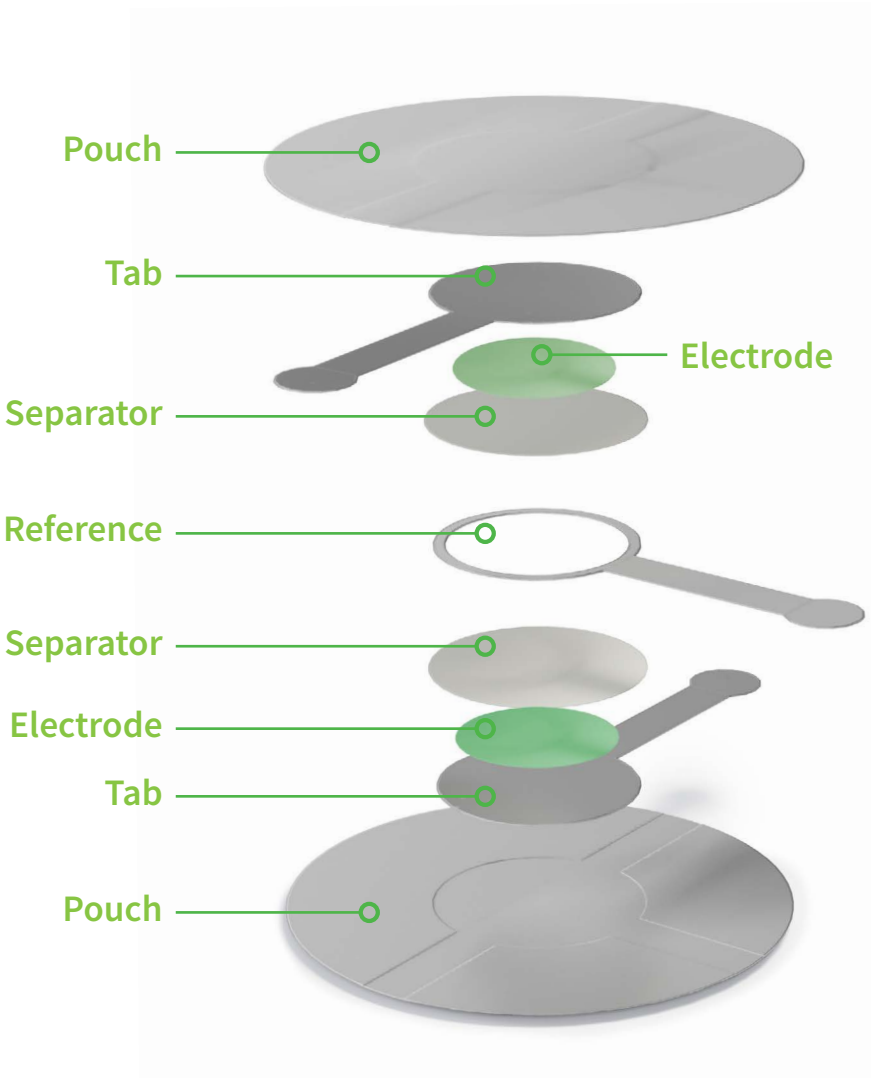


PROTOCELL - BEYOND COIN CELLS

Cellerate has developed a new test cell format called the Protocell, it is a novel approach to cell development that uses standard coin cell sized electrodes but in a pouch cell format.

Along with the consumables being cheaper than coin cells, Protocells can include a reference electrode for advanced testing.

Together with the components, we additionally provide a dedicated Protocell test jig, which cleanly connects to anode, cathode, and reference tab. Cellerate's pressure applicator can then precisely control pressure from 0.1 MPa up to 50 MPa, with potential for higher if required.

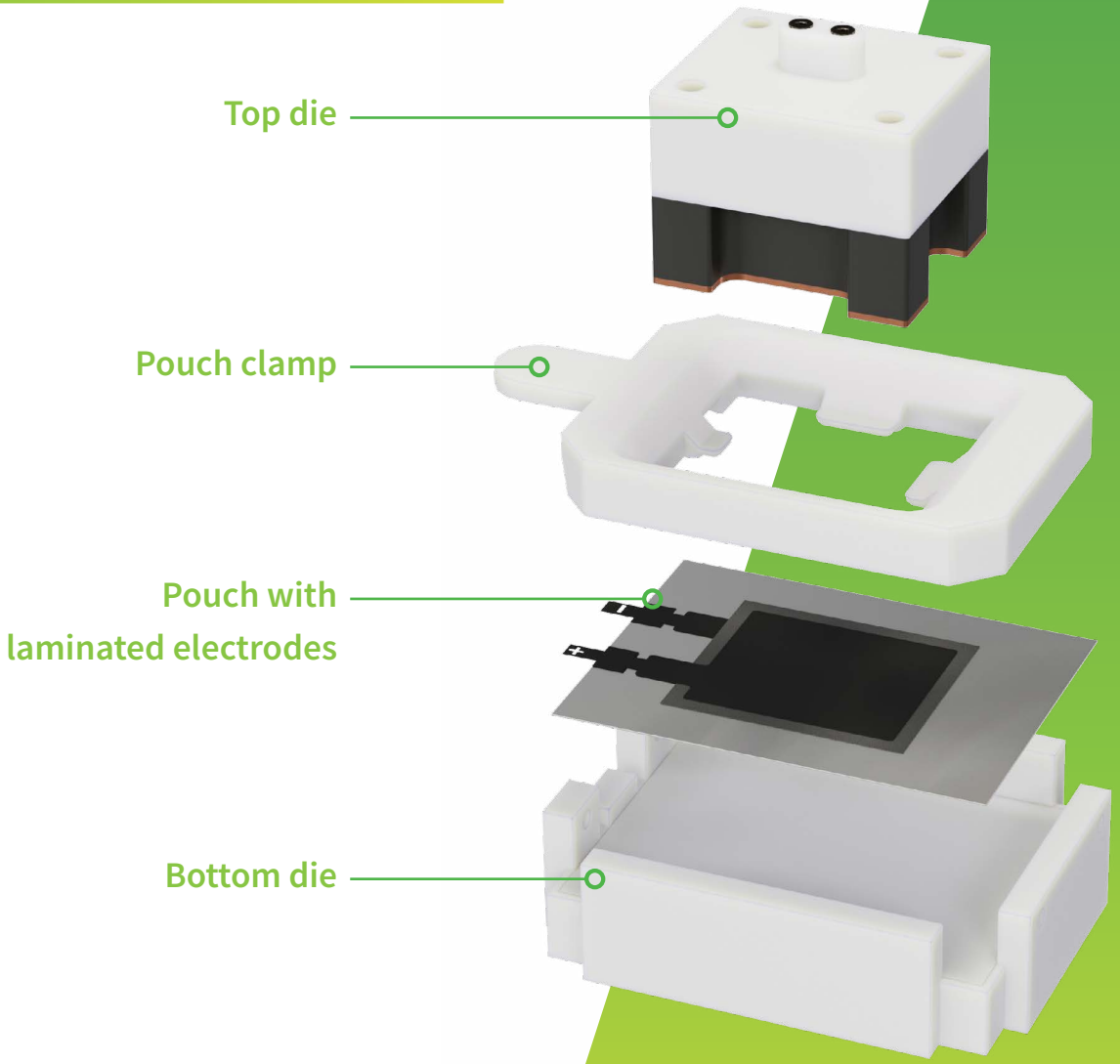


SINGLE-LAYER POUCH SEALING

The interchangeable dies of the CASS Sealing Module allow you to alternate between coin, pouch and Protocell assembly and sealing.

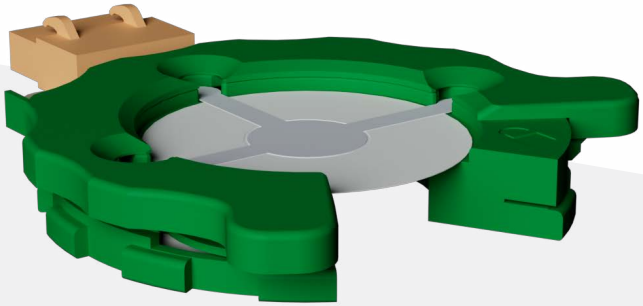
For the production of high quality single layer pouches, we provide a lamination die that allows you to perfectly align electrodes to the pouch before being pressed and sealed.

The operator can then choose to complete three or four side sealing. Three side sealing allows electrolyte infusion at a later time. Four side sealing allows immediate infusion of electrolyte and cell finishing, removing the need for separate pouch sealing equipment.



CASS | FUTURE-PROOF EXPANSION (COMING SOON)

The modular nature of CASS doesn't just apply to the modules and accessories available today, our R&D team has an extensive product road map that includes some of these developments, which will be available within the next 6 months.



Protocell Test Holder

The Protocell Test Holder enhances your ability to work with and test Cellerate Protocells. The standard holder implements a 4-wire Kelvin connection method for accurate resistance measurement while our advanced holder includes additional contact for the reference electrode. All versions are compatible with our controlled pressure application jig for applying up to 50 MPa electrode stack pressure.

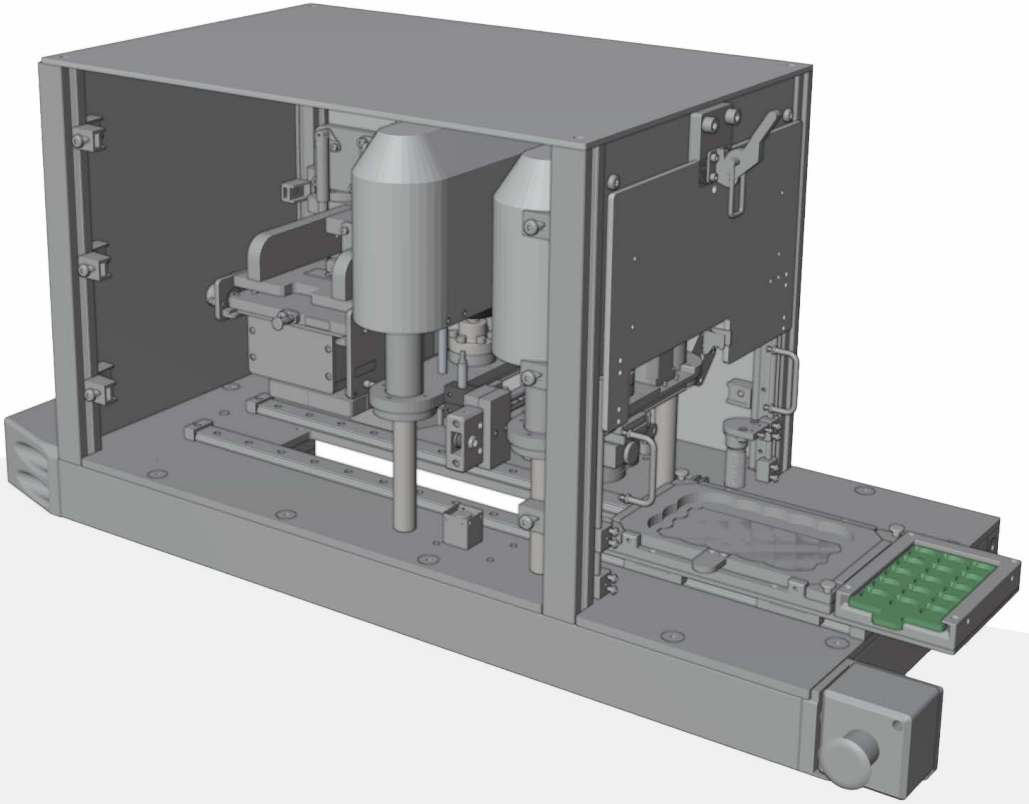
UV/IR Curing Unit

This add-on for the CASS Assembler Module will provide both ultra-violet and infra-red curing capabilities for cells, allowing you to cure polymer electrolytes and electrode coatings during the automated cell assembly process. The intensity and time can be controlled, and vacuum impregnation of viscous electrolytes into the electrode structure is possible.

Electrode Preparation (EPREP) System

Automatically cut, weigh and measure coin cell electrodes with this compact bench-top system. The EPREP System cuts samples from coated sheets, and automatically captures all the metrics needed for calculating volumetric and gravimetric energy density. Once prepared, these electrode discs can be seamlessly loaded into the CAS System for insertion into cells, creating a streamlined workflow from material preparation to cell assembly.

The EPREP system has been designed in partnership with the **Centre for Process Innovation (CPI)** to minimize manual handling and reduce the risk of damaging delicate electrode coatings. It not only saves time, but also improves sample integrity, and it includes an advanced resistivity measurement tool to quantitatively verify coating properties, making it ideal for battery material quality control. With the ability to process hundreds of samples per week, this system integrates perfectly with the CAS System, driving efficiency in battery R&D labs.



cpi

Additional products & services

RAPID CELL PROTOTYPING AT SCALE

We’re developing a high-volume cutting rig that can accept anode, cathode and separator materials on a single roll to facilitate the rapid cutting of material at scale.

The rig transports the roll to a cutting area, where a computer-controlled mechanical blade or laser cuts the material to the shape and size you need. Shapes can be laid in any orientation, allowing you to minimise the amount of waste material produced.

PILOT-SCALE PRODUCTION SERVICES

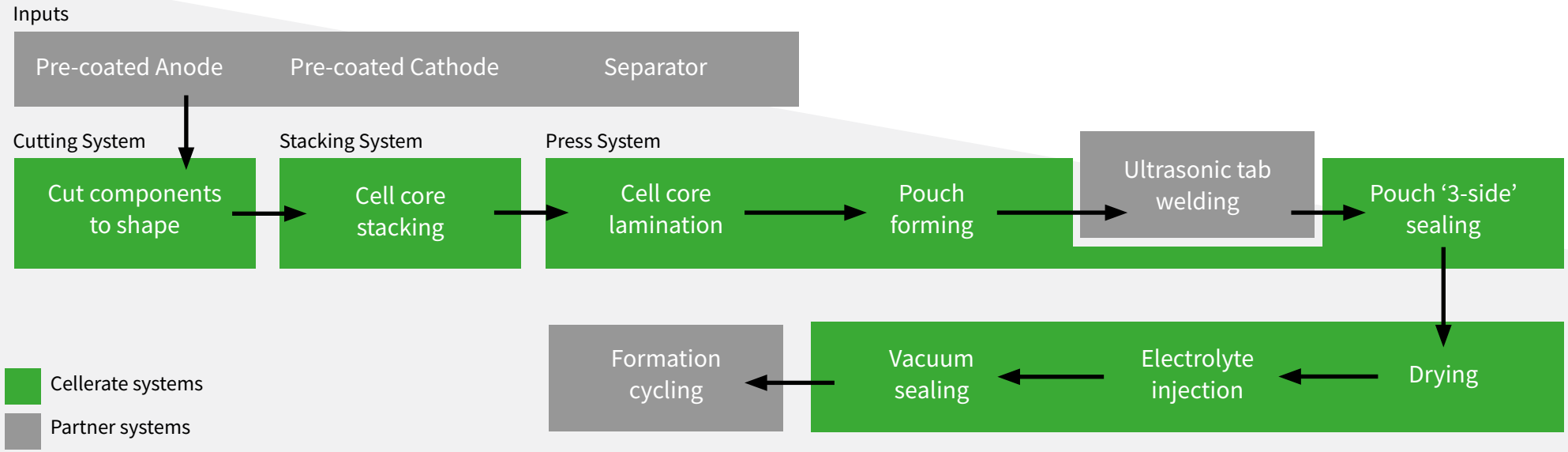
If you need a scaled approach to single or multi-layer pouch cell production for a one-off project, or would rather not invest in large-format equipment, then you can take advantage of our pilot-scale production services.

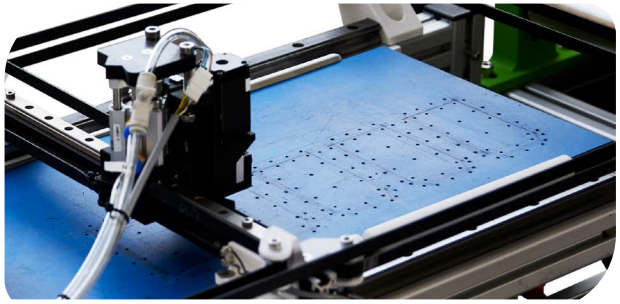
Under this project-based service, our team will work directly with you to produce your prototype cells within our labs, before shipping the completed prototypes back to you.

Please contact the Cellerate team if this service is of interest.

MULTI-LAYER POUCH CELL ASSEMBLY

The Multi-layer Pouch Cell Assembly System allows you to produce complex multi-layer pouch cells consistently and reliably. This new approach to automatic pouch cell assembly provides rapid reconfigurability, accelerating discovery across R&D and quality control while saving lab space.



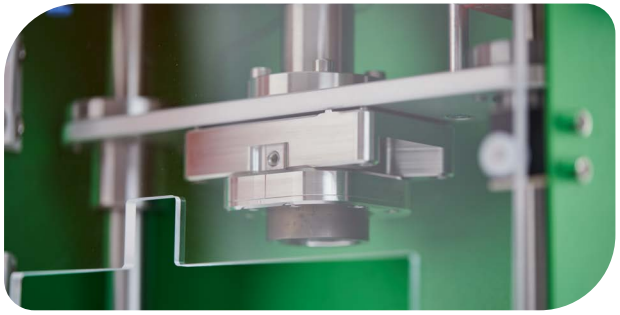


Cutting system

Choose between mechanical or laser based cutting of your anode, cathode and separator materials, which you're able to cut to practically and size and shape.

Stacking system

A compact and easy to configure solution, this system allows you to stack conventional and solid-state cells by simply swapping out the head.



Multi-functional press

A space-saving press that is capable of pouch forming, 3-side pouch sealing and electrode stack lamination all within the same unit.

COMING SOON | Li Metal Stacking System

We're currently developing an advanced cutting and stacking system designed specifically for Li Metal electrodes that will be small enough, like CASS, to fit in a standard lab glovebox. This device is perfect for Li-S or lithiated Si cells. Contact our team for more information and availability dates.

Why Cellerate?

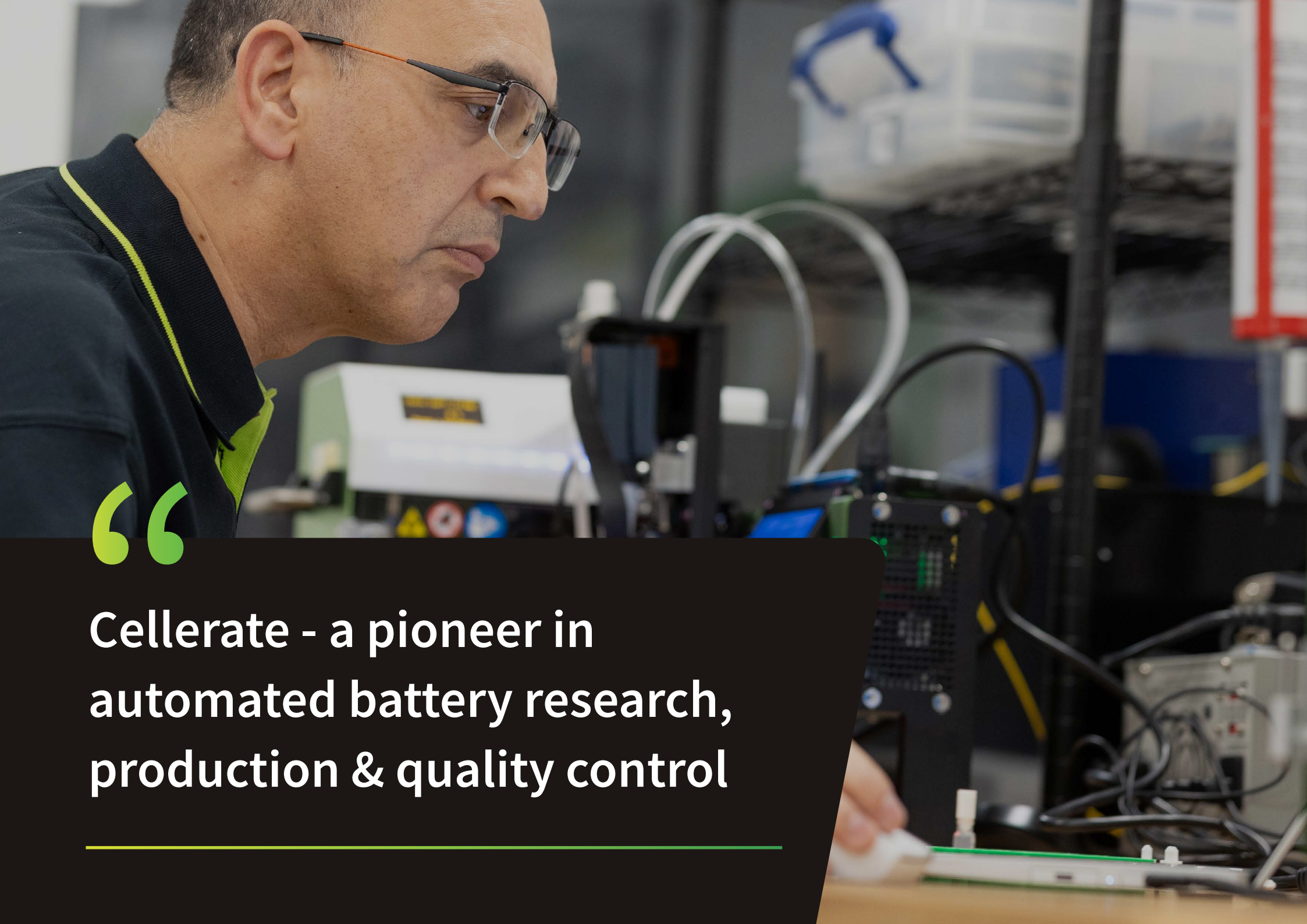
WHY CELLERATE | BATTERY EXPERTS

The Cellerate team is made up of a unique combination of electrochemical energy storage experts and experienced automation engineers. Together, we share a passion to accelerate the research and commercialisation of new battery technologies.

Cellerate was founded by Dr. Richard Fields who has a Masters degree in aerospace engineering and a Ph.D in material science, specialising in hybridising supercapacitor and battery materials to make lithium-ion capacitors. After his Ph.D, he ran the Energy Research Laboratory at the National Graphene Institute, and established the pilot-scale battery laboratory in the Graphene Engineering Innovation Centre (GEIC), both at the University of Manchester. It was at this point he grasped the challenges of advanced battery materials research and experienced the dull pain of manual cell assembly.

Building upon this, he founded a start-up called the Holy Grail which was accepted onto the prestigious Y-Combinator accelerator program in Mountain View, California. He used his time on the accelerator program to build a prototype closed-loop automated battery research system and refine the technical implementation of the Protocell format. This was followed by experience in establishing a venture building arm of Labman Automation, a UK based automated laboratory equipment manufacturer, the culmination of which was the creation of Cellerate.

Cellerate was registered in late 2020 with the first prototype cell assembly system being delivered to Prof. Helge Stein at Karlsruhe Institute of Technology, Germany, before the end of 2021. It was during this year that co-founders and company directors Dr. Michael Greaves, Alexandre Bento and Christos Bartzis joined Richard in driving cell assembly system development. Since then, Cellerate has been rapidly expanding to meet the growing demands of automation across the battery sector. In 2024 the company opened new 600 square meter headquarters for system production and process research in central Manchester.



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Cellerate - a pioneer in automated battery research, production & quality control

WHY CELLERATE | AN R&D-LED APPROACH

Cellerate is a pioneer in automated battery research, production and quality control. It provided the first fully automated cell assembly system which could be integrated directly into existing workflows while providing extensive research capabilities. Our patented component placement validation system allows organisations to not just identify correct alignment of components but also to identify defects within the electrodes themselves, unlocking new opportunities for in-depth science and automated quality control. This, paired with our extensive in-house development and testing new processes, allows us to handle challenging electrode materials and electrolytes without compromise.

Due the nature of our work, we continually meet expert scientists and engineers in the battery sector, some of who face significant challenges in developing and manufacturing advanced batteries. We have formed a number of partnerships and have research projects with the UK Government, large EU consortiums and a range of universities and research technology organisations across the UK and are open towards research collaborations. We have a strong desire to underpin the development of the next generation of battery materials.

Our R&D focus revolves around the following topics:

- Human labour-intensive research and production tasks
- Battery research and production instrumentation
- New process development, such as polymer curing and sodium metal handling
- Reference electrode development
- Solid-state research methods
- Pilot scale pouch cell manufacturing
- Custom battery manufacturing

SUCCESS STORY | LEIBNIZ-INSTITUT FUR NEUE MATERIALIEN

The Leibniz-Institut für Neue Materialien (INM), based in Saarbrücken, Germany, focuses on developing new materials. It is part of the Leibniz Association, a network of German research institutes. INM conducts interdisciplinary research at the interface of materials science, biology, chemistry, and physics. Its primary goal is to develop innovative materials with advanced properties that can be applied to various industries, including developing advanced battery technology.

How has Cellerate changed the way people manage their time?

The Cellerate system has made our workflow more efficient. Previously, assembling large batches of cells was a time-consuming, manual process that occupied a considerable portion of our day. This automated process allows our team to concentrate on more complex tasks and high-value experiments. We've also reduced human error, which, in turn, reduces the number of failed experiments and material waste, allowing us to make the most of our resources instead of correcting mistakes.

What improvements have you seen in data quality and traceability?

The Cellerate system combats inconsistencies we used to experience with manual assembly. Every assembly process step is now traceable, with specific parameters tied to each assembly procedure. This level of detail ensures that our results are highly reproducible and reliable, giving us confidence in the data we generate.

What has been the broader impact of these improvements on your projects and decision-making?

Now our data is accurate and traceable, we can more confidently establish conclusions and identify trends. This reliability also allows us to explore more creative approaches in our experiments, knowing we can always trace back and validate our results.

How was the process of implementing the Cellerate system in your lab?

The implementation process was seamless, thanks to the comprehensive support we received. Our team were guided through each step, ensuring everything was set up according to our needs. We felt well-supported throughout the entire process.

How long did getting users trained and familiar with the Cellerate system take?

Once set up and optimised for our materials, new users are trained quickly and become confident in basic operation within a few days. We've also found that the user-friendly interface made it easy for our team to adapt quickly.

How would you describe your experience with Cellerate's customer support?

Our experience with Cellerate's customer support has been stellar. The team is always quick to respond, providing timely and effective assistance whenever we've had questions or encountered challenges. Whether troubleshooting an issue or helping us customise features to better fit our needs, the team has always been very reliable.

SUCCESS STORY | C4V

C4V™ is an intellectual property company based in Binghamton, New York with expertise and patented discoveries in Lithium-Ion battery composition and manufacture. C4V leverages its expertise in electrode design and process development to create next-generation storage materials that can be seamlessly integrated into current cell manufacturing lines.

What measurable improvements have you seen using Cellerate technology?

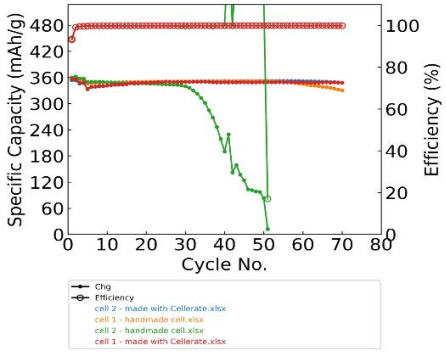
The R&D team reports significant improvements in the accuracy and reproducibility of electrochemical measurements by using Cellerate's automatic coin cell sealer and assembler. The battery technicians and engineers leading the effort at C4V agree that the automation of the coin cell assembly process has favourably impacted the overall throughput and yields, thereby affording significant cost savings, both in terms of reduced reworking and material losses. Automation of mechanical processes, including accurate dosing of electrolytes, which was a major source of batch and operator variability, has increased the team's confidence in data interpretation, allowing more rapid and complete evaluation of new materials. The vision system installed on the automatic coin cell fabrication platform allows seamless detection of any defect introduced during the assembly process.

How has the Cellerate system impacted your production?

The team unanimously agrees that the coin cells made by Cellerate's machine are simply "better" than the handmade cells. A seasoned battery engineer with 5+ years of experience in R&D says, "I am personally happy to see such good EC results with the machine. As early adopters of the technology, while we had to deal with some minor hiccups early on, the issues were rapidly resolved by the Cellerate's engineering team. Also, it's important to note that our company makes lots of coin cells on a daily basis, sometimes up to 70-100 cells in a day or a week, which is considerably higher than the number of cells that small labs in universities make. We work with a variety of materials and chemistries that also need more adjustments in the Cellerate machine, which may not be the case in universities or small labs."

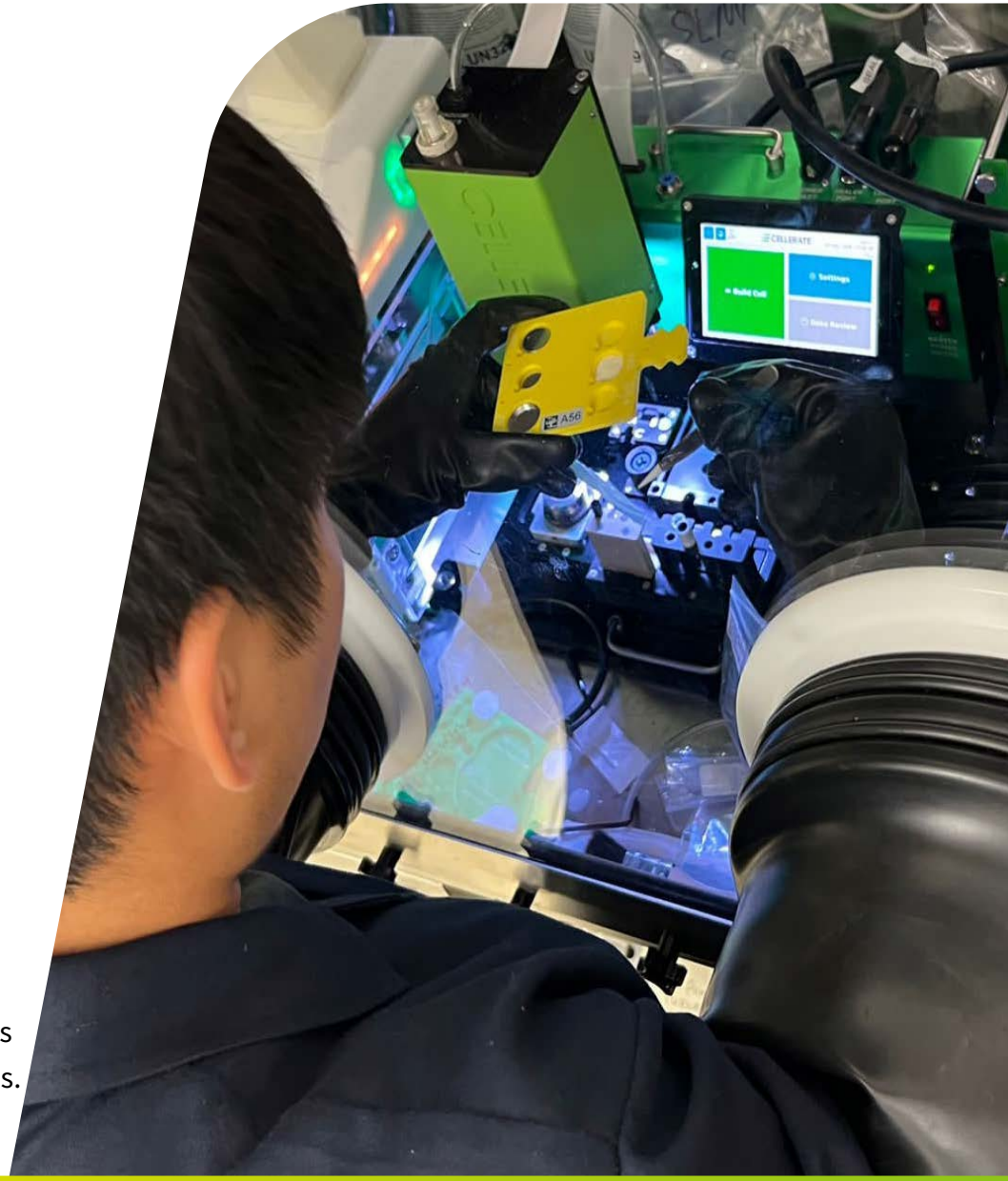
What improvements have you seen in data quality and traceability?

The electrochemical data presented below clearly distinguish the quality of Cellerate-made Half Coin Cells (HCC)s vs hand-made HCCs. The data from the cells plotted below were made with similar components, the only difference being the method of assembly: Cellerate-made vs Hand-made cell.



OCV (V)	Cell #1	Cell #2
Cellerate-made cell	2.99	3.04
Hand-made cell	1.95	2.53

The above plot shows that the Cellerate-made cells show higher capacity retention up to 70 cycles (impressive for HCCs with Li chip). There is also a noticeable consistency in the data gathered from Cellerate-made cells, i.e. smaller standard deviation. This consistency results in data reliability, particularly in the cycle life studies where it is absolutely critical to active data accuracy and repeatability over 100+ cycles. In addition, the machine-made cells tested in a bigger sample size show even better data consistency among the cells.



Additional information

WARRANTY AND SERVICE OPTIONS

Expert maintenance and support – ensuring reliability beyond warranty

At Cellerate, we are committed to providing reliable, long-term performance for your laboratory automation systems. Once the warranty period for your equipment has expired, we offer flexible options to keep your systems running smoothly and minimize any potential downtime.

Self-maintenance solutions

For customers with in-house technical expertise, Cellerate provides spare parts and maintenance kits designed for easy installation. Our user manuals offer clear, step-by-step instructions to help you maintain the equipment with confidence. Additionally, our support team is available for video call assistance, ensuring you have expert guidance whenever needed.

On-demand maintenance services

If you occasionally need professional support, our on-demand services allow you to request repairs or routine checkups when required. This flexible option lets you maintain your equipment on your schedule with the assurance that expert help is just a call away.

Extended service contracts

For uninterrupted operation, our extended service contracts ensure your system stays fully operational and optimally maintained. These agreements cover regular maintenance and repairs, providing peace of mind and minimizing downtime. Additionally, we offer bespoke solutions tailored to your specific operational needs, designed to minimize downtime and keep your lab running efficiently.

At Cellerate, we tailor our service solutions to meet your specific needs, ensuring your investment continues to deliver top-quality performance for many years.

FREQUENTLY ASKED QUESTIONS

What cell formats and cell sizes can the Cellerate system make?

The Cell Assembly and Sealing System (CASS) can make any size coin cell. It can also make single-layer pouch cells with up to 40 x 60 mm electrodes, including custom geometries. The CASS cannot produce multilayer cells as there are no in-built tab welding capabilities, so tabs must be welded onto electrodes before placing them in the system.

What is the throughput of the Cellerate system?

The throughput of the CAS System depends on the build configuration, but on average, the standard system is capable of 2.5 to 5.0 minutes per cell, so 12 to 24 cells can be built per hour. Custom solutions are available with higher throughput up to 40 cells per hour.

Does the Cellerate system work in a glovebox?

Yes, Cellerate systems are designed with glovebox work in mind so they can be used with the battery industry's most challenging materials. This includes considerations for electronics operating under an argon atmosphere and in a vacuum.

Is there an API for the Cellerate system?

Yes, there is an API for the Cellerate system, which uses Python. This makes integrating the system with LIMS (Laboratory Information Management System) easy.

Does the Cellerate system have a remote control?

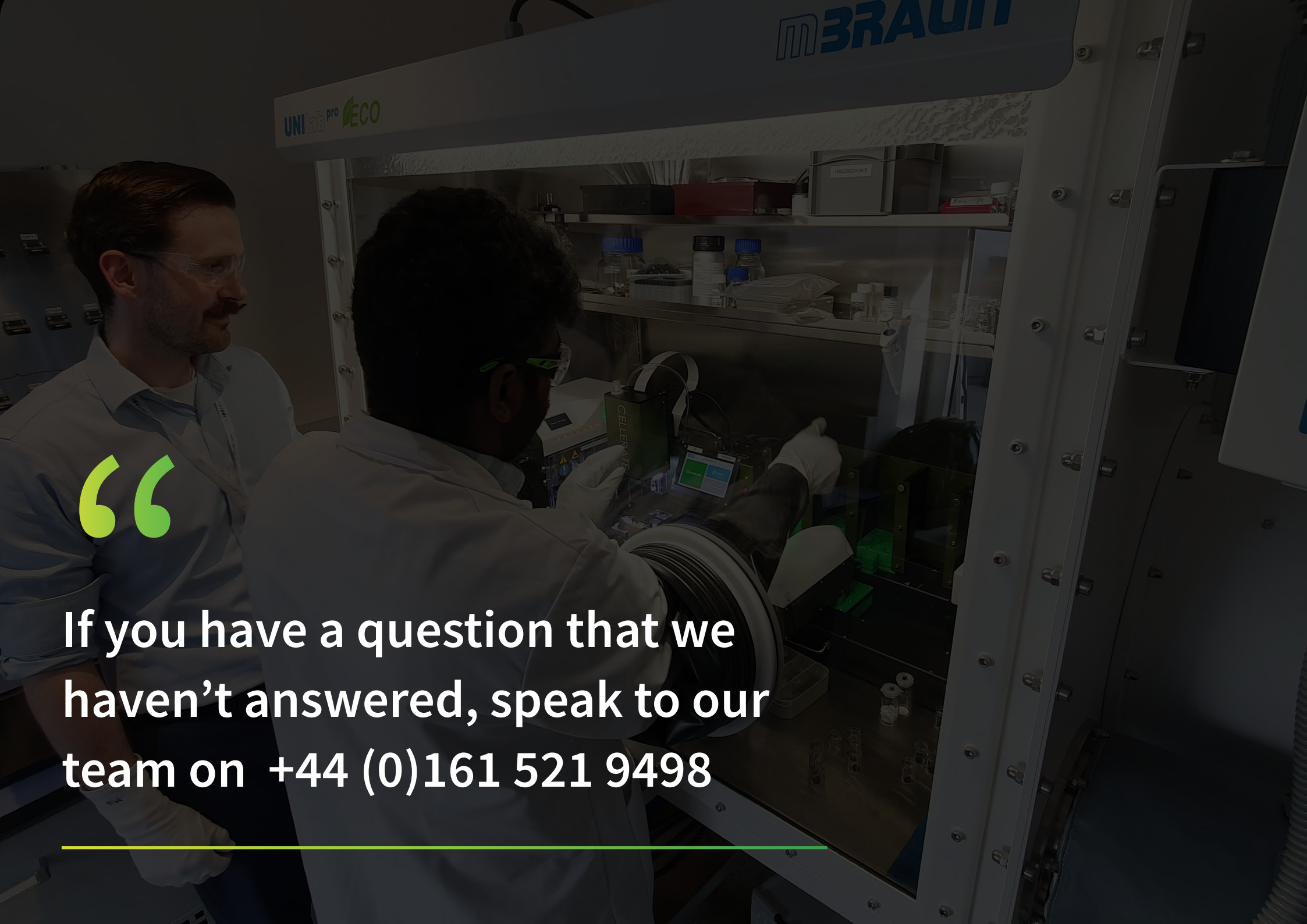
The system can be remotely configured and controlled from an external computer. Image and data extraction is also possible remotely.

Does the system require three-phase power or compressed air?

No, all that is needed to operate the CAS System is a connection to standard mains electricity. For glovebox use, we have designed the power cable to pass through a KF-40 port.

What is a "Protocell"?

A Protocell is essentially a coin cell in a pouch casing. This format enables users to control the pressure more precisely, and add a reference electrode (third electrode) to see how the potential of each electrode changes individually while charging and discharging.



“

If you have a question that we haven’t answered, speak to our team on +44 (0)161 521 9498

Product specifications

CASS | SEALER MODULE SPECIFICATION

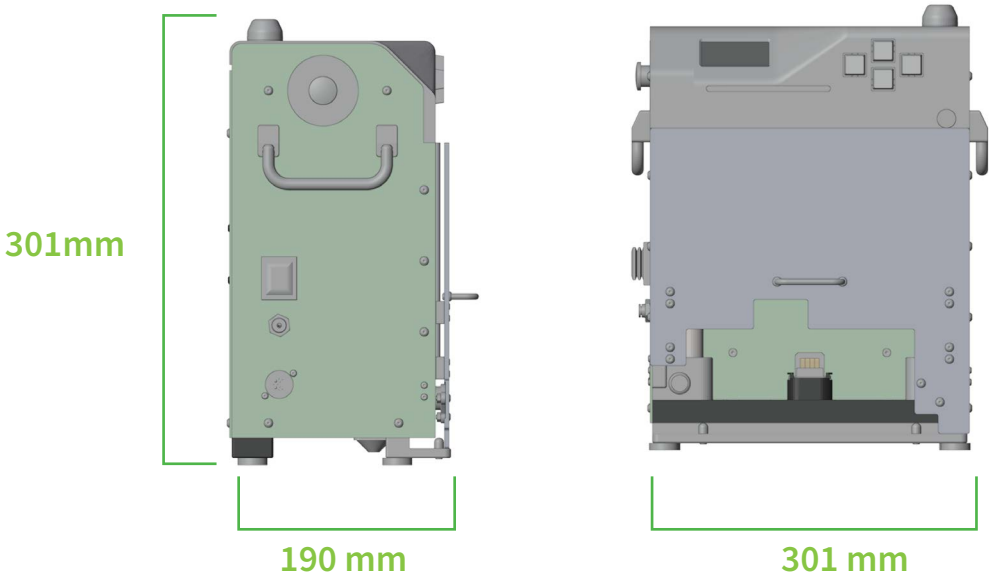
General specifications

Compatible with all standard coin cell sizes
Coin crimping force: 0.5 to 10 kN force. Standard crimping force 6 kN
Suitable for use in argon glovebox
Compatible with vacuum antechamber
Compatible with dry room
Power safety interlock on guard panel
Dimensions: (W x H x D): 301 x 301 x 190 mm
Weight: 12 kg
Operating voltage: 24 V
Peak power draw: 100 W
Nominal power draw: 10 W
Ambient Temperature: 10-30°C

Pouch sealing specifications

Core specifications same as base model
Build single layer pouch cells with up to 40 x 60 mm active area
Pouch sealing force: 0.5 to 1 kN
Sealing temperature up to 180 °C (top/bottom separately configurable)

Vacuum level:
Applied vacuum during seal: 10 kPa
Compatible with external vacuum pump



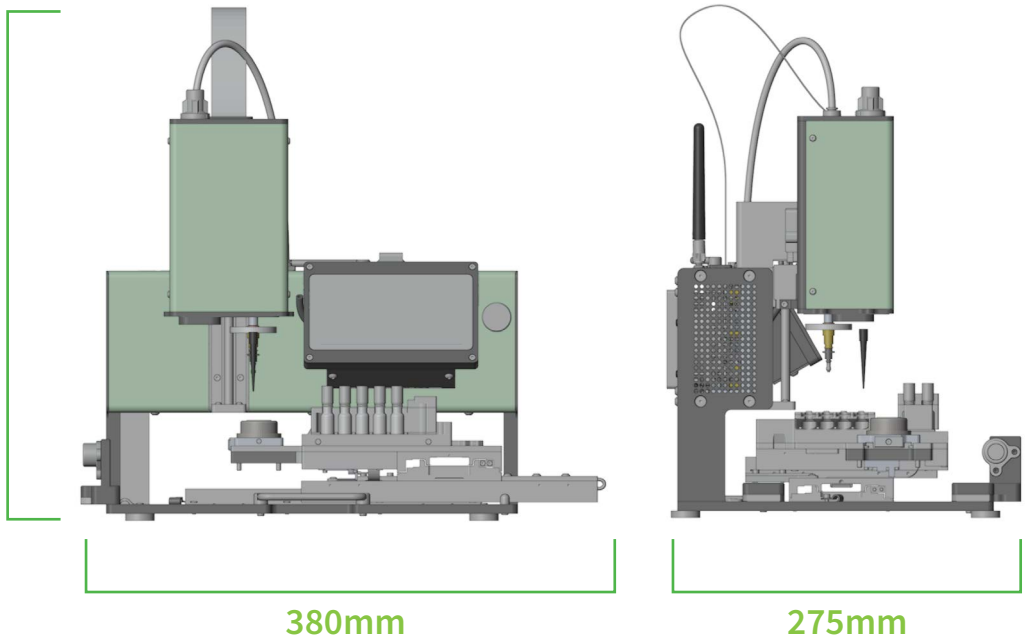
CASS | ASSEMBLER MODULE SPECIFICATION

General specifications

Assembles 12-24 cells per hour depending on build procedure
Compatible with pure Li and Na metal electrodes for half-cell configurations
Compatible with all common separator materials, including PP based
Compatible with all common electrolytes
Compatible with curved electrodes
Automated 5-200 µL micropipette for electrolyte
Removable rack holds 4 × 2 mL vials and pipette tips
Optional rack expansion of 10 electrolyte vials
Wi-Fi, Ethernet and USB ports for data transfer and software updates
API for external process control and database interaction
Operator collision detection with safe stop

Features

Connects to and controls the Sealer and Autoloader modules
Dimensions (W x H x D): 380 x 290 x 275 mm
Weight: 10 kg
Operating voltage: 24 V
Peak power draw: 60 W
Nominal power draw: 20 W
Ambient Temperature: 10-30°C

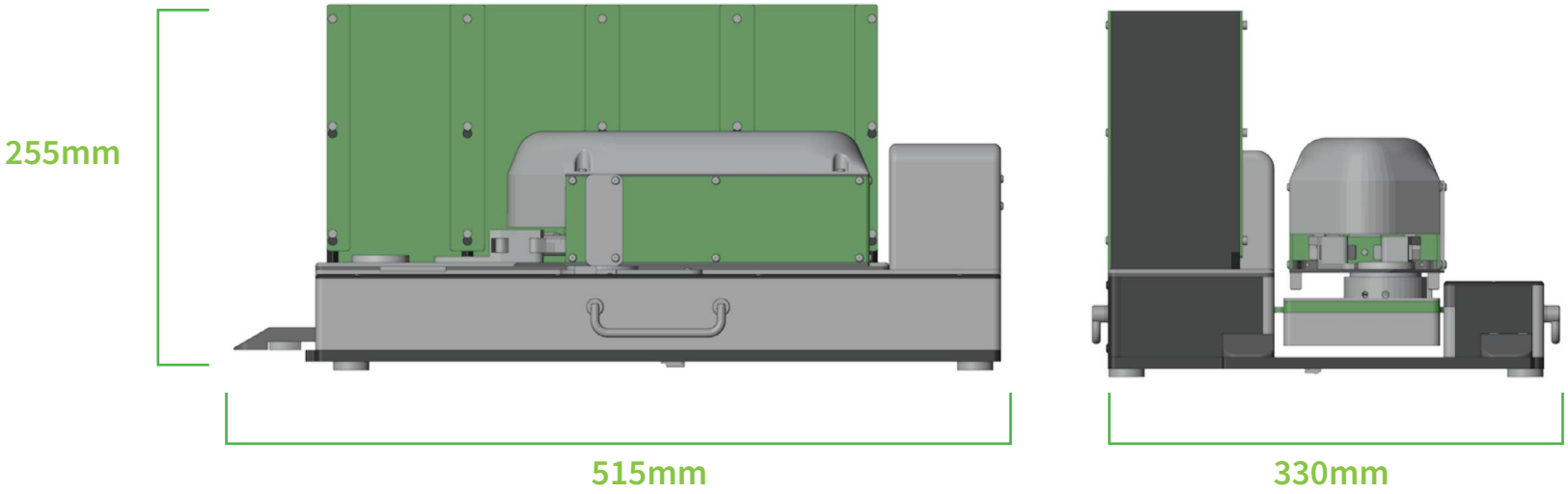


CASS | AUTOLOADER MODULE SPECIFICATION

General specifications

Set-up time approximately 1 hour for 100 cells
Unattended run time approximately 6 hours for 100 cells
Compatible with both coin and pouch cells
Tray tagging for easy cell identification
Compatible with vacuum antechamber of standard glovebox
Operator collision detection with safe stop
External emergency stop button to place outside glovebox

Dimensions (WxHxD): 510 x 255 x 330 mm
Weight: 10 kg
Operating voltage: 24 V
Peak power draw: 40 W
Nominal power draw: 5 W
Ambient Temperature: 10-30°C



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