Hot Cells & Gloveboxes

Product Overview Guide

ROBATEL technologies

ABOUT ROBATEL

With over 70 years of expertise, Robatel Technologies is a leading designer, manufacturer, and installer of custom hot cells and gloveboxes for nuclear applications. We have completed projects ranging from small single-box cells to complex multi-cell systems with automated transfer processes. Our hot cells are integral to material research, isotope production, and nuclear medicine.

We have pioneered the use of interlocking lead panels, streamlining assembly and disassembly while enhancing shielding integrity and allowing for easy future modifications. By controlling the lead pouring process, we minimize imperfections like air bubbles, reducing the risk of radiation streaming.

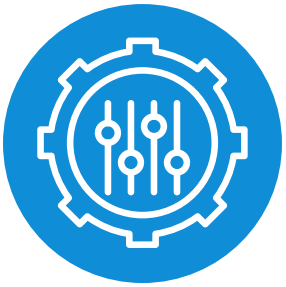
At Robatel, we collaborate closely with clients to ensure our systems seamlessly integrate into their processes. Our hot cells can include advanced features such as rotating airlocks, internal transfer tunnels, and docking stations for transportation casks. We also provide maintenance and refurbishment services, including shielded window replacement and stainless steel shell modifications.

In addition to hot cells, Robatel offers bespoke gloveboxes, particularly for waste processing and irradiated materials handling. These gloveboxes often feature lead paneling, stainless steel construction, HEPA filtration systems, and remote handling tools for safe and efficient operations.

Our turnkey solutions encompass the full project lifecycle, including design, fabrication, testing, installation, and commissioning. We specialize in containment systems that meet stringent ISO 10648-2 standards, with comprehensive capabilities in gamma and neutron protection, seismic resistance, and ergonomics.

From concept to completion, Robatel delivers integrated, reliable, and high-performance containment systems tailored to the nuclear industry's unique challenges.

High Functionality



Fully Customizable

Built to NQA-1, ASME, and/or ISO Standards

GLOBAL PRESENCE & MANUFACTURING CAPABILITIES

At Robatel Technologies, we leverage our global expertise and advanced manufacturing facilities to deliver custom-engineered containment solutions for nuclear, radiopharmaceutical, and research applications. With strategic locations in the United States and France, we provide comprehensive support from design and fabrication to installation and maintenance.

Robatel Technologies - US Headquarters
Roanoke, VA, USA

- Sales, project management, and engineering support for North American operations.
- Coordination of design, licensing, and regulatory compliance for U.S.-based projects.
- Customer support, refurbishment services, and spare parts supply.

Robatel Industries - Manufacturing Facility
Genas, France

- 100,000+ sq. ft. advanced manufacturing facility, specializing in:
  - Hot cell, glovebox, and nuclear cask manufacturing.
  - Custom lead shielding production with in-house lead pouring and machining.
  - High-precision welding, CNC machining, and metal fabrication for containment systems.

Robatel Industries - Secondary Manufacturing Facility
La Hague, France

- 30,000+ sq. ft. advanced manufacturing facility
- Similar capabilities to Genas, expanding our production capacity

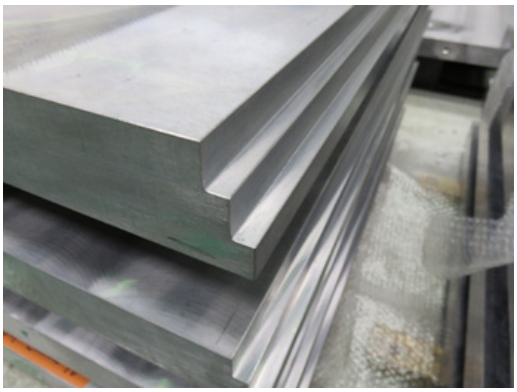
IN-HOUSE METALWORK

At Robatel Technologies, we leverage decades of engineering expertise to deliver high-precision containment solutions for the nuclear, radiopharmaceutical, and research industries. Our vertically integrated approach allows us to control every stage of the process, ensuring the highest quality standards, efficiency, and cost-effectiveness.

Our key metalwork & fabrication capabilities include:

- **Welding & Machining:** ASME-certified precision welding, CNC machining, and assembly for high-strength components.
- **Lead Shielding Integration:** In-house lead pouring and machining for custom shielding, minimizing defects such as air pockets.
- **Structural & Sheet Metal Fabrication:** Custom fabrication of stainless steel, carbon steel, and aluminum components, ensuring durability and radiation resistance.
- **Surface Treatments & Coatings:** Corrosion-resistant electropolishing, powder coating, and acid-resistant linings for long-term protection.

Lead Machining



Lead Machining

Lead Casting

Lead Casting

HOT CELL OVERVIEW

Scope of Services:

- Concept development, design, and licensing strategy
- Basic and detailed engineering with 3D modeling and planning
- Construction and manufacturing coordination
- Material sourcing and procurement
- Fabrication, delivery, and on-site assembly
- Commissioning and comprehensive staff training
- Quality assurance and final project documentation

Features & Equipment

- Movable worktables and in-cell storage solutions (e.g., floor or barrel storage)
- In-Cell gantry cranes with external drive motors for precise material handling
- Airlocks for drums and small parts, enhancing safety and efficiency
- Tools and systems for dismantling and conditioning processes
- Remote-controlled handling technology, such as master-slave manipulators
- Comprehensive shielding options, including walls, gates, and radiation protection windows
- Steel linings and penetrations for secure equipment integration
- Advanced electrical, control, and measurement systems
- In-cell lighting, audio, and video technology for enhanced monitoring
- Ventilation systems for nuclear containment and safe airflow management
- Ergonomically designed workstations and human-factor considerations for optimal usability
- Specialized hatches, doors, and access points, including smear test transfer hatches and personnel access from maintenance zones

Robatel also provides advanced gamma and neutron shielding using lead, steel, and proprietary compounds, ensuring maximum protection and system reliability. Our designs focus on safety, functionality, and ease of use, tailored to meet the demands of complex nuclear applications.

COPYRIGHT© ROBATEL TECHNOLOGIES - H&G | Rev 2.0 - 2025-03-03

GLOVEBOX OVERVIEW

Scope of Services:

- Concept development, design, and licensing strategy
- Basic and detailed engineering with 3D modeling and planning
- Construction and manufacturing coordination
- Material sourcing and procurement
- Fabrication, delivery, and on-site assembly
- Commissioning and comprehensive staff training
- Quality assurance and final project documentation

Features & Equipment

Robatel's gloveboxes offer advanced containment solutions, with customizable features tailored to specific processes and applications, including:

- **Radiation Shielding:** Options include lead, steel, and additional materials as required.
- **Glove Ports & Viewing Panels:** Customizable viewing panels, aluminum frames, and machined frames.
- **Remote Handling Equipment:** Includes pneumatic transfer systems, drum handling equipment, tongs, and manipulators.
- **Containment & Contamination Control:** Integration with in-cell ventilation and external systems, ensuring safe containment.
- **System Integration:** Fully compatible with existing systems and applications for seamless operation.
- **Safety Features:** Fire extinguishing systems, leak tightness (ISO 10648-2), controlled atmospheres, and enhanced protection standards.

Our gloveboxes are built-to-order with flexible designs, incorporating stainless steel shells, HEPA filtration systems, and remote handling capabilities for efficient waste processing and manipulation of irradiated materials. Additionally, Robatel gloveboxes are designed with safety and functionality in mind, following international standards like EUROCODE, RCC-M, and ASME, ensuring high performance in demanding nuclear environments.

EXAMPLE PROJECTS

Project 1: TRUIMF Hot Cell

Robatel has played a critical role in the development and implementation of TRIUMF's advanced hot cell systems, supporting both the ARIEL (Advanced Rare Isotope Laboratory) and ISAC (Isotope Separator and Accelerator) facilities. These facilities are key components of TRIUMF, Canada's national particle accelerator center, which produces rare isotopes for nuclear medicine, astrophysics, and fundamental nuclear research.

Our scope of work at TRIUMF included the design, fabrication, and integration of hot cells equipped with advanced remote handling infrastructure, including cranes and telemanipulators, which facilitate the safe and efficient exchange of highly radioactive targets. The ARIEL facility, in particular, features features a next-generation hot cell system designed for the routine remote handling of radioactive targets exposed to high-radiation environments, with minimized operator exposure. By applying lessons learned from facilities such as CERN-ISOLDE and TRIUMF's own ISAC facility, Robatel delivered hot cells that optimize target maintenance processes and maximize operational uptime.

TRIUMF Hot Cell Construction

TRIUMF Hot Cell Shielded Windows and Manipulators

Key Highlights

- **High-Power Beams:** Protons (48 kW, 480 MeV) and electrons (100 kW, 30 MeV) target porous materials to produce isotopes for nuclear research.
- **Remote Handling Systems:** Advanced systems, including hot cells and telemanipulators, allow safe target exchanges and maintenance in high radiation areas (10 Sv/h at 1 m).
- **Modular Target Design:** ARIEL features modular target assemblies and remote service connections, reducing the need to transport entire modules.
- **Operational Improvements:** Enhanced systems improve flexibility, safety, and minimize downtime.
- **Increased Target Capacity:** ARIEL can handle 26 targets per year, compared to ISAC's 10.
- **Post-Irradiation Handling:** Includes systems for storing, processing, and examining irradiated targets.
- **Integration with Operations:** Rotating airlocks, transfer tunnels, and docking stations support efficient cask transportation.

EXAMPLE PROJECTS

Project 2: ANSTO Hot Cells

Robatel supplied three hot cells for the Australian Nuclear Science and Technology Organization (ANSTO), designed for testing irradiated materials. The cells were equipped with manipulators, shielded windows, and testing equipment such as Charpy-V and tensile machines. The project involved 190mm lead shielding and containment for leak-tightness.

ANSTO Hot Cells

Shielded Windows and Manipulators for ANSTO Hot cells

Key Highlights

- **Facility Design:** The facility consists of three interconnected hot cells, each with specific functions. Cell 1 handles cutting and machining, Cell 2 acts as a contamination barrier, and Cell 3 is used for mechanical testing.
- **Advanced Machining:** A unique feature is the installation of a combined CNC milling and Electro Discharge Machining (EDM) center for cutting and preparing highly radioactive materials into test specimens, such as “dog-bone” tensile samples and small punch discs.
- **Shielding & Containment:** The cells feature Pb-4%Sb shielding, with precision-engineered lead panels and a ventilation system ensuring containment that meets ISO 17873 standards for nuclear facilities.
- **Versatility & Testing:** The facility includes tools for mechanical testing and optical microscopy, with the capacity to adapt to future testing needs by reconfiguring Cell 3. It also accommodates third-party projects and OPAL’s materials surveillance program.

EXAMPLE PROJECTS

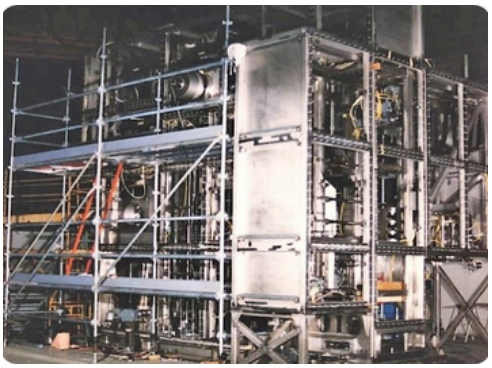
Project 3: MELOX Glovebox System

Robatel successfully contributed to the design, fabrication, installation, and testing of advanced glovebox systems at the MELOX facility, which specializes in the production of MOX (Mixed Oxide) fuel, recycling plutonium for nuclear power generation. The gloveboxes at MELOX are designed to handle highly radioactive materials, ensuring operator safety and maintaining stringent environmental controls.

Our work at MELOX involved the development of glovebox systems for the storage and handling of radioactive powders, fuel pin decontamination, and fuel pin handling. These systems are critical to the safe and efficient handling of radioactive fuel, while maintaining high standards of decontamination and safety through specialized trolleys and filtration systems.

The gloveboxes were equipped with pre-clogging THE filters to manage contamination and ensure compliance with regulatory standards. Additionally, the glovebox systems provided safe, remote handling and decontamination of fuel pins, aligning with MELOX's mission of recycling nuclear material for use in reactors.

Fuel Pins Decontamination Glovebox



Storage and Handling of Powders Glovebox System

Key Highlights

- **Glovebox Scope:** Design, fabrication, installation, and testing of gloveboxes tailored for the handling of radioactive powders and fuel pins, with specialized trolleys for decontamination processes.
- **Advanced Filtration:** The use of pre-clogging Triethylene Glycol (THE) filters for contamination control, ensuring operator safety and environmental compliance.
- **Fuel Pin Decontamination:** Integration of systems dedicated to the decontamination and handling of fuel pins, minimizing contamination risks and improving safety.
- **Trolleys for Handling:** The gloveboxes feature customized handling trolleys designed to transport and process fuel pins safely and efficiently.
- **Turnkey Delivery:** Provided end-to-end services, including design, manufacturing, on-site assembly, and testing of the glovebox systems.
- **Compliance and Safety:** All glovebox systems were designed and tested to meet the stringent safety and regulatory requirements necessary for handling radioactive materials in a controlled environment.

MAINTENANCE & AFTERMARKET SUPPORT

At Robatel Technologies, we understand that ensuring the long-term performance, safety, and regulatory compliance of hot cells and gloveboxes is essential for our clients. Our comprehensive maintenance and aftermarket support services help extend the lifespan of your equipment while minimizing downtime and operational risks.

Comprehensive Maintenance Solutions
Robatel offers a full range of maintenance services to keep your containment systems operating at peak efficiency. Our expert technicians provide:

- Routine Inspections & Preventive Maintenance: Regular evaluations to identify wear and tear, ensuring continued compliance with safety standards.
- Performance Optimization & Upgrades: Enhancing existing systems with state-of-the-art shielding, ventilation, and automation solutions.
- Emergency Repairs & Rapid Response Services: Fast, on-site support to address unexpected equipment failures and minimize downtime.
- Leak Tightness & Containment Testing: Ensuring gloveboxes and hot cells meet strict containment performance standards, including ISO 10648-2 requirements

Refurbishment & Equipment Upgrades
For aging infrastructure or evolving operational needs, Robatel provides custom refurbishment services to modernize your hot cells and gloveboxes without requiring a full system replacement. These services include:

- Shielded Window Replacement: Upgrading radiation-resistant glass and sealing materials to maintain visibility and protection.
- Glovebox & Manipulator Repairs: Repair or replacement of gloves, remote manipulators, and tongs to ensure smooth operation.
- Steel Shell & Structural Enhancements: Reinforcing stainless steel enclosures, modifying penetrations, and upgrading support structures.
- Ventilation & Filtration System Upgrades: Installing HEPA filtration, controlled atmosphere features, and fire suppression enhancements.

Retrofitting & System Integration
Our team specializes in adapting existing containment systems to accommodate new processes and technologies, including:

- Remote Handling & Automation Integration: Retrofitting existing hot cells with robotic manipulators, conveyors, and automated handling tools.
- Process Adaptation & Equipment Customization: Modifying containment units for new applications such as radiopharmaceuticals, nuclear fuel processing, or waste management.
- Regulatory Compliance Upgrades: Ensuring compliance with the latest safety and operational standards for continued regulatory approval.

Dedicated Support & Spare Parts Supply
We provide ongoing technical support and a dedicated supply chain for critical spare parts, ensuring quick replacements and minimal downtime. Our services include:

- Spare Parts Inventory & Procurement: Stocking essential components such as shielding panels, lead windows, gloves, and seals.
- Training & Operator Support: Hands-on training for operators and maintenance personnel to ensure safe and efficient system operation.
- Remote & On-Site Troubleshooting: Direct support from our engineering team to diagnose and resolve operational issues quickly.

CONTACT & NEXT STEPS

At Robatel Technologies, we are committed to delivering high-quality, customized hot cells and gloveboxes to meet the needs of the nuclear, radiopharmaceutical, and research industries. Whether you are looking for a new containment solution, upgrades to an existing system, or expert consultation, our team is here to help.

Get in Touch
Our experts are available to discuss your project requirements and provide tailored solutions that align with your operational needs. Contact us today to learn more about our products and services.

Robatel Technologies – U.S. Headquarters
5115 Bernard Drive, Suite 304
Roanoke, VA 24018, USA
Phone: +1 (540) 989-2878
Email: info@robateltech.com
Website: www.robateltech.com

How to Proceed

1. **Request a Consultation:** Reach out to our sales and engineering teams to discuss your containment needs and project specifications.
2. **Define Your Requirements:** Our team will work closely with you to understand your operational challenges and technical needs to propose the best solution.
3. **Receive a Customized Proposal:** Based on your requirements, we will provide a tailored solution, including design concepts, technical capabilities, and estimated timelines.
4. **Project Kickoff & Engineering Support:** Once the proposal is finalized, our team will initiate design, engineering, and manufacturing processes with full customer collaboration.
5. **Delivery, Installation & Ongoing Support:** We provide end-to-end services, ensuring seamless installation, operator training, and long-term maintenance support.

Stay Connected
Follow us on LinkedIn for updates on our latest projects, industry news, and technical advancements in nuclear containment solutions.

LinkedIn: www.linkedin.com/company/robatel-technologies

We look forward to partnering with you on your next project. Contact us today to get started!