

Battery Risk Management

Standard abuse testing and existing regulatory frameworks alone are insufficient for predicting or preventing battery failures. ioMosaic offers global expertise to help you minimize your exposure to fire, injury, property damage, and litigation. We deliver a comprehensive process safety approach that combines detailed hazard analysis and specialized laboratory testing to address primary failure drivers:

Hazard	Mitigation
Cell Defects	Evaluating cell design, conducting manufacturing process and quality audits, and performing cell and battery pack teardown assessments help identify failure mechanisms.
Unstable Chemistry	Balancing high-capacity choices (like nickel manganese cobalt oxides or NMC) against inherently safer thermal profiles (like lithium ferrophosphate or LFP) by strategically evaluating battery performance and testing thermal behavior in calorimeters.
Thermal Runaway	Engineering multi-layered protection and deflagration safeguards under the assumption that thermal runaway is inevitable to prevent fire propagation across cells, modules, and racks.

Battery Hazard Analysis (BHA)

Process safety aims to identify best practices, address potential risks, and ensure facilities are safe. A proactive approach can help minimize loss of life, environmental impact, equipment damage, and litigation.

Hazard Identification Assessment (HazId)

Big-picture review focusing on each phase of manufacturing or Battery Energy Storage System facility and information known to date. Used in the initial stages of the project prior to detailed design completion to identify general hazards and start development of safeguards against those hazards.

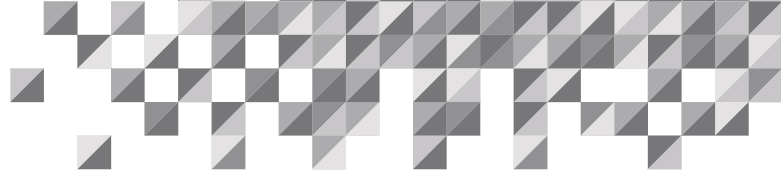
Laboratory Testing

We work in concert with our colleagues at ioKinetic, LLC, to understand potential consequences evaluated in risk assessments. This modern, ISO 17025 accredited testing facility is equipped with a variety of instruments that include, but are not limited to, reactivity testing, battery testing, and dust testing.

Hazard and Operability (HAZOP)

A qualitative, detailed review of each phase of production, raw, and finished material storage. This study identifies potential scenarios where the process can operate outside the intended design and then develop recommendations for scenarios with unacceptable risk.

Continued...



Layer of Protection Analysis (LOPAs)

A semi-quantitative review of high-risk scenarios from HAZOP ensures there are adequate independent protection layers to meet your risk profile.

Safety Instrumented System

An analysis of electronic safety shutdowns to ensure they function when you need them to.

Alarm Rationalization

An evaluation to ensure setpoints give operators enough time to see the hazard, understand it, decide the appropriate response, and act before an incident occurs, and also better prevent nuisance trips.

Facility Siting

A risk-based analysis to understand worst-case consequences and their probabilities related to fire, thermal, and toxic releases in order to understand how worst-case consequences can potentially affect occupied buildings and areas.

Human Factors Basis of Design & Safety Critical Activities

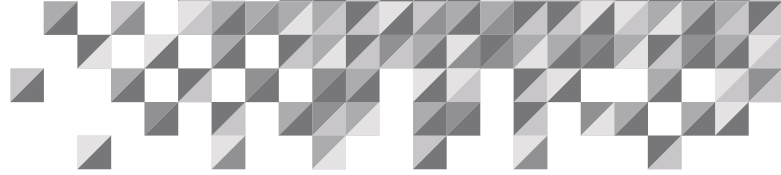
A study to identify potential design issues and activities that can lead to operator errors or losses of containment, and correct them.

Emergency Scenario Risk Assessment

A review to ensure infrastructure and emergency response plans are in place for major events.

Interested In Learning More?

We understand the safety and risk processes needed or adhered to worldwide, and we deliver practical, locally compliant solutions to safety and risk challenges facing our clients. Call us today at **1.844.ioMosaic** or email us at **sales@ioMosaic.com**. We would love to hear from you.



About ioMosaic Corporation

Through innovation and dedication to continual improvement, ioMosaic has become a leading provider of integrated process safety and risk management solutions. ioMosaic has expertise in a wide variety of areas, including pressure relief systems design, process safety management, expert litigation support, laboratory services, training and software development.

ioMosaic offers integrated process safety and risk management services to help you manage and reduce episodic risk. Because when safety, efficiency, and compliance are improved, you can sleep better at night. Our extensive expertise allows us the flexibility, resources, and capabilities to determine what you need to reduce and manage episodic risk, maintain compliance, and prevent injuries and catastrophic incidents.

Our mission is to help you protect your people, plant, stakeholder value, and our planet.

Overview of most services / products we provide:

- Asset integrity
- Auditing
- Chemical reactivity management
- Combustible dust hazard analysis (DHA) and testing
- Due diligence support
- Effluent handling design
- Facility siting
- Fire and explosion dynamics
- Incident investigation, litigation support, and expert witness
- Liquefied natural gas (LNG) safety
- Pipeline safety
- Pressure relief and flare system design
- Process engineering design and support
- Process hazard analysis (PHA)
- Process safety management (PSM)
- Quantitative risk assessment (QRA)
- Risk management program development
- Software solutions
 - Process Safety Enterprise®
 - Process Safety Learning®
 - Process Safety Office®
 - Process Safety Project Opportunity Marketplace (PSPOM™)
 - Process Safety tv®
- Structural dynamics
- Training (open enrollment, online, and customized)

For more information on ioMosaic, please visit: www.ioMosaic.com

