ioMosaic

Minimizing risk. Maximizing potential.®

Our Services

At ioMosaic, we deliver practical solutions to our clients' diverse and complex process safety challenges. ioMosaic has the global knowledge, experience and resources to support your needs. We work in four complementary areas:

- Process safety design
- Risk management
- Software
- Training

Process Safety Design

Pressure Relief Systems

A risk-based approach to pressure relief and flare systems (PRFS) design helps develop economical designs for foreseeable relief scenarios and mitigate low frequency but near-unventable scenarios to a tolerable level of risk. Our expertise provides integrated solutions, including any necessary reactivity screening and data testing support. We differentiate from others by using Process Safety Office® SuperChems™ software which includes pressure relief design, chemical reactivity assessment, consequence analysis and quantitative risk analysis to stand above the rest.

Chemical Reactivity Management

Safe design and operation of chemical processes requires a thorough understanding of chemical reactivity and thermo-kinetics. Our services include physical testing, interpretation of results, analysis and implementation. Our exclusive partnership with ioKinetic, LLC - an ISO 17025 accredited testing facility - allows us to provide reliable, efficient and affordable testing and analysis services.

Relief Disposal Systems

SuperChems™ provides comprehensive specification of relief systems including sizing of relief devices, associated inlet and outlet piping, and simultaneous calculation of relief header, knock-out vessel and vent or flare stack pressure drop. Using SuperChems™ we can calculate dispersion and radiation effects associated with venting or flaring, and perform sizing calculations for specified relief handling equipment including cyclones, knockout drums and quench tanks.

Combustible Dust Analysis and Testing

We have extensive experience with the evaluation and interpretation of dust hazards and reactivity. Because each dust compound has unique physical and chemical characteristics, a good understanding of both is essential to understand the hazards, and ultimately the risks, associated with dust being handled. Our exclusive partnership with ioKinetic, LLC allows us to provide reliable, efficient and affordable testing and analysis services to support compliance with EU ATEX and UK DSEAR requirements.

Risk Management

Process Safety Management

Our professionals have decades of experience working with process safety management (PSM) systems, providing unsurpassed efficiency and expertise. We can help you comply with internal company standards, EU Seveso and UK COMAH requirements, US OSHA's PSM Standard and US EPA's RMP Rule. Our proactive approach, including detailed planning and implementation, can address applicable regulations and minimize safety risks, environmental impact, equipment damage and potential litigation.

Process Hazard Analysis

ioMosaic can prepare, organize and lead process hazard analysis studies (PHAs), working alongside your internal technical and operations staff. Our experience, coupled with recognized methodologies such as hazard and operability study (HAZOP), "What-If" Checklist, fault tree analysis, layer of protection analysis (LOPA), failure mode and effects analysis (FMEA) and inherently safer design, together with Process Safety Office® - PHAGlobal® software to record and document PHAs, helps make us the PHA experts of choice.

Quantitative Risk Assessment

ioMosaic has performed quantitative risk assessment (QRA) on a wide range of fixed facilities, pipelines and transportation systems. QRA involves detailed analysis of the expected frequency and consequences of potential accidents associated with a facility or operation. QRA is an invaluable method for informing risk-based process safety planning and facility siting decisions. It enables a detailed understanding of process risks, including how these can be better managed and mitigated. We use Process Safety Office® - SuperChems™ to conduct QRAs.

Incident Investigation

With decades of collective experience in incident investigation, our specialists have expertise in the proper technical disciplines required to investigate fires, explosions, and toxic releases. We have

Our facility siting calculations use all main approaches (risk-based, consequence-based or look-up against relevant standards) to help you demonstrate risk is being managed appropriately.

worked with facility management and in-house safety personnel to conduct effective investigations and analysis of serious incidents.

Process Safety Auditing

Process Safety Audits provide ongoing quality assurance for your process safety management (PSM) system. Audits ensure that your management system complies with applicable regulations, industry and company standards and guidelines. ioMosaic works with your team members or leader to provide the necessary hands-on experience. We use Process Safety Office® - ioAuditor™, which includes pre-populated protocols to simplify documentation of findings and audit recommendations.

Litigation Support and Expert Witness

ioMosaic has experience in providing litigation support for industrial accidents caused by failures of equipment, controls, policies and procedures, or operator action. Our services include Expert Witness testimony, Expert Opinion reports and white papers such as Root Cause Analysis and Verification of Physical Evidence. ioMosaic was one of a select few that provided expert testimony on a landmark case that alleged willful violations of various subsections in the US OSHA PSM standard.

Software

ioMosaic is a unique provider of integrated, ever-green process safety software – **Process Safety Enterprise®** - web based, and **Process Safety Office®** – desktop based. Used by over 250 clients worldwide and proven in use on hundreds of client assignments, we are proud to have our **Process Safety Office®** software distributed by the Design Institute for Emergency Relief Systems (DIERS) and the American Institution of Chemical Engineers (AIChE) as their industry standard.

Our powerful **Process Safety Office®** desktop-based applications provide engineers and EHS professionals with an integrated suite of applications for process safety management.

We use our software tools in all projects where there is a need for Process Hazard Analysis, Dust Hazard Analysis, Consequence Analysis, Risk Analysis, Facility Siting, Pressure Relief and Flare Systems Design, Process Safety Auditing and Management of Change.

Many of our clients additionally choose to license our software. We provide flexible licensing terms and can offer selected software tools from our application suite depending on need. Hosting services are also available.

Process Safety Enterprise® provides additional integrated web-based functionality for the management of process safety data across different physical locations— for example sharing of audit findings, tracking of PHA recommendations and many other uses that can be tailored to meet your needs in a secure environment.

Process Safety Office®

SuperChems™
Perform consequence analysis, quantitative risk analysis, facility siting and pressure relief and flare systems evaluation and design

ioAuditor™
Perform audits based on relevant industry, corporate and ISO-based protocols

PHAGlobal®
Perform process hazard analysis (PHA) and LOPA studies

ioViper™
Evaluate vibration-induced fatigue in process, emergency and flare system relief piping

ioVu™
Construct visual piping isometrics

ioLogic™
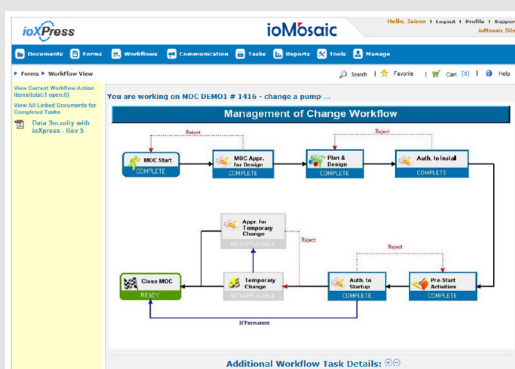Construct fault trees and perform SIS/SIL analysis

ioSecure®
Assess the vulnerability and security of chemical industries

User-defined
Customise our software with your own user-defined components

Process Safety Enterprise® includes workflow and business rules management across complete business processes

Process Safety Enterprise® includes workflow and business rules management across complete business processes such as Management of Change, compliance assurance, incident investigation and capital expenditure. Its simple web-based interface is designed to help you easily track action items and their status.

Training

Our training is designed to give you clear and practical know-how to protect stakeholder value, reduce episodic incidents and comply with safety regulations and company standards.

We offer both traditional classroom-based training (open enrolment and on-site) and online training delivered through our **Process Safety Learning®** platform.
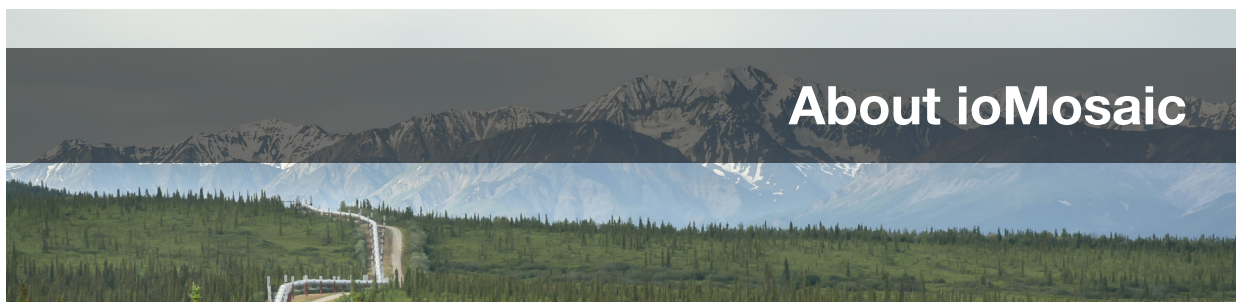
Our classroom-based training is led by ioMosaic senior staff and industry experts. Our instructors are well-known for depth of experience, and strong academic and operating backgrounds.

Process Safety Learning® delivers quality courses in an easy-to-use learning management system. Process Safety Learners from operators to upper management can cost effectively complete courses and get certified anytime and anywhere (eliminating travel costs).

Process Safety Learning®

www.ioMosaic.com/PSL

We can offer the following services via **Process Safety Learning®**:

- Certified online training: helping you track your progress through our secure online training platform

- Scaleable Learning Management: bespoke training for your organization, helping you easily comply with the latest industry requirements

- Course authoring services: supporting delivery of your own best practice training material, to address corporate policies and safety guidelines

About ioMosaic

ioMosaic is an integrated process safety and risk management firm focused on helping you manage and reduce risk. Through innovation and dedication to continual improvement, we have become a leading provider of integrated process safety and risk management solutions. We have expertise in a wide variety of areas, including pressure relief systems design, process safety management, expert litigation support, laboratory services, training and software development. Our over 300 years of combined industry expertise allow us the flexibility, resources and capabilities to determine what you need to reduce and manage risk, maintain compliance and prevent injuries and catastrophic incidents.

Our mission is to help you protect your people, plant, stakeholder value, and our planet. Because when safety, efficiency, and compliance are improved, you can sleep better at night.

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