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Minimizing risk. Maximizing potential.®

Process Safety Office®

Leverage a fully integrated platform for process safety and risk management

ioMosaic Corporation is an exclusive distributor of Process Safety Office®.

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Process Safety Office® Introduction

Process Safety Office® provides process safety and risk professionals with an integrated suite of tools for process hazards analysis, auditing, consequence analysis, risk analysis, facility siting, and pressure relief and flare systems evaluation and design.

ioMosaic is devoted to assisting our clients in safeguarding their people, plant, and stakeholder value. We are dedicated to the development of software applications to further support and maintain our client's daily safety and risk management objectives. Our goal is to provide seamless integration of process safety and information technologies for compliance, risk management, and business efficiencies. We want to minimize your risk while maximizing your potential.

To ensure this commitment, we provide an integrated, practical, versatile suite of tools that are a 'must have' for the serious process safety and risk professional.

Process Safety Office® (client side) – An essential tool for leveraging a fully integrated platform for process safety and risk management activities daily:

- Assess
- Calculate
- Evaluate
- Design
- Model
- Quantify
- Mitigate
- Single User
- Multiple User

Process Safety Enterprise® (server side) – Effectively manages the reliability, availability, maintainability, and auditability of all Process Safety Management (PSM) Elements:

- Workflow
- Manage
- Audit
- Track
- Share
- Control
- Centralize
- Compliance Assurance
- Report
- Communicate
- Leverage all data and information
- Enterprise
- Collaborate

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Process Safety Office® has several integrated components:

SuperChems™

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

ioAuditor™

Perform compliance audits based on OSHA PSM/RMP, CCPS RBPS audit protocols, corporate protocols, ISO compliance audits

ioVu™

Construct visual piping isometrics

PHAGlobal®

Perform process hazard analysis (PHA) and LOPA studies

ioLogic™

Construct fault trees and perform SIL/SIS analysis

ioViper™

Evaluate vibration induced fatigue in process and emergency and flare system relief piping

ioSecure®

Assess the vulnerability and security of chemical facilities

User-Defined

Customize Process Safety Office® with your own user-defined component

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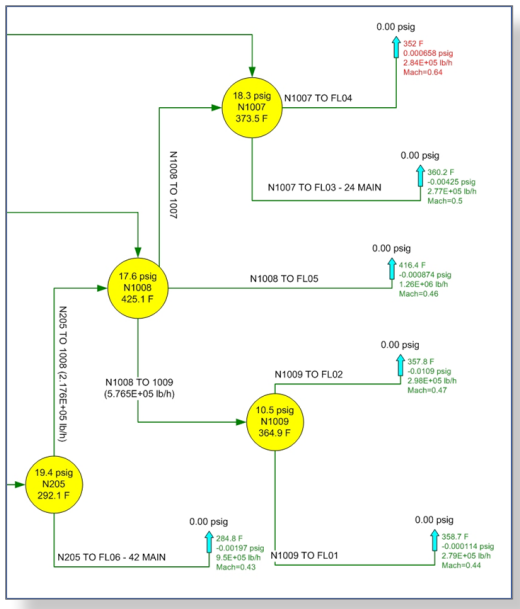
SuperChems™ Component

A comprehensive platform for process safety

SuperChems™ is an integrated platform for pressure relief design, chemical reactivity assessment and management, consequence analysis and quantitative risk assessment. Combine with Process Safety Enterprise® for a complete pressure relief system data lifecycle management solution.

Features

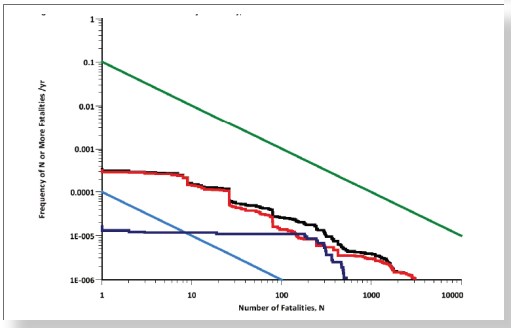


Pressure Relief and Flare Systems

- Pressure relief design for multi-phase, reacting systems
- Flare systems hydraulics and vibration risk identification
- Piping networks
- Vent containment design
- Deflagration venting and dynamics

Consequence Analysis and Fluid Flow

- Source term estimation
- Dispersion modeling
- Explosion dynamics

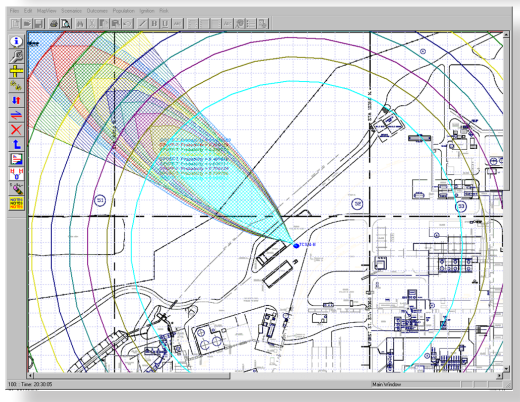


Quantitative Risk Assessment (QRA)

- Fixed facilities QRA
- Individual and societal risk estimates
- Pipeline transportation risk
- Risk-based inspection per API-581

Facility Siting

- Identify structures at risk (building risk)
- Calculate maximum foreseeable loss



Chemical Reactivity

- Experimental data analysis and reduction
- Reaction kinetics and dynamics
- Thermal explosion theory (1D and 2D)

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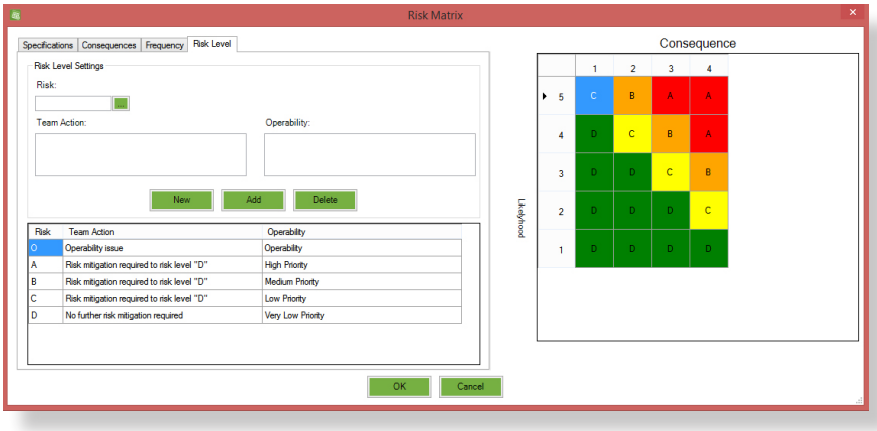
PHAGlobal® Component

A process hazard analysis management software

PHAGlobal® is process hazard analysis documentation software that simplifies recording of findings and tracking of follow-up from PHAs. There is no need for special application software when working with the results. Using standard Excel functions, PHAGlobal® makes it easier to comply with codes and standards that require PHAs, such as OSHA PSM, EPA RMP and NFPA 654.

A True Windows™ Excel Application

PHAGlobal® uses standard Excel menus and keystrokes. All end users can read PHA results without special software application installation. Each study section is saved as a separate tab in an Excel workbook. Furthermore, you can share data with other Windows applications.



Features

- PHA methodologies include: *HAZOPs, LOPAs, FMEAs, What-If and Checklist*
- Multiple pre-populated checklists for dust hazard PHAs, in accordance with NFPA 654
- Fully adaptable for up to a 6x6 risk-ranking matrix, multiple risk rankings
- Auto-population of many sections
- Auto-generates action tracking sheets
- **Security vulnerability analysis methodology**
- Automatically renumbers scenarios when lines are added or deleted
- Pre-start up safety review included as checklist option
- **Multiple language support (Spanish, Portuguese, Mandarin and Dutch, in addition to English)**
- Categorizes action items as pre-start up or post start-up
- Use different templates and methodologies within a single PHA
- Color-coding of study worksheet tabs based on methodology utilized
- Contains default phrases to simplify recording
- One-click, concise report
- **Centralize and manage PHAs for multiple facilities with Process Safety Enterprise®**

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ioAuditor™ Component

Simplify compliance. Track, report, and present audits even easier and quicker than before.

ioAuditor™ records the results of any type of audit including process safety management and risk management plan compliance audits.

Key Features

- Simple Microsoft® Excel® based, yet very powerful compliance and auditing tool
- Visual, intuitive, quantitative and qualitative reports for presenting and compliance filing
- Ability to integrate entire teams' work to prepare comprehensive summaries with a few clicks
- Track regulatory, local attention, compliance or RAGAGEP findings and analyze them with ease
- Identify compliance gaps easily and track action items upon completion of audits
- Track auditor's guidance and create appropriate action items to fill gaps
- Create a history and log of audits for continuous improvement and compliance
- Conduct Process Safety Survey of employees. Establish, improve and sustain process safety culture in the organization
- Best practice templates in line with industry standards, protocols and guidelines

Compliance reporting

- Audit for the practices of engineering and geoscience: Consistent with APEGA
- Inspection and repair practices audit for automatic pressure-relieving devices: Consistent with API 576
- Risk Based Process Safety audit: Consistent with CCPS RBPS
- Environmental risk management audit: Consistent with EPA RMP
- Emergency Relief System's Process Safety Gap Analysis
- Environmental Management Plan: Consistent with ISO 14001
- Quality Management Audit: Consistent with ISO 9001
- Process Safety Management audit by OSHA
- Behavior based safety Survey and Analytics

- Corporate governance Survey and Analytics
- Process safety culture Survey and Analytics

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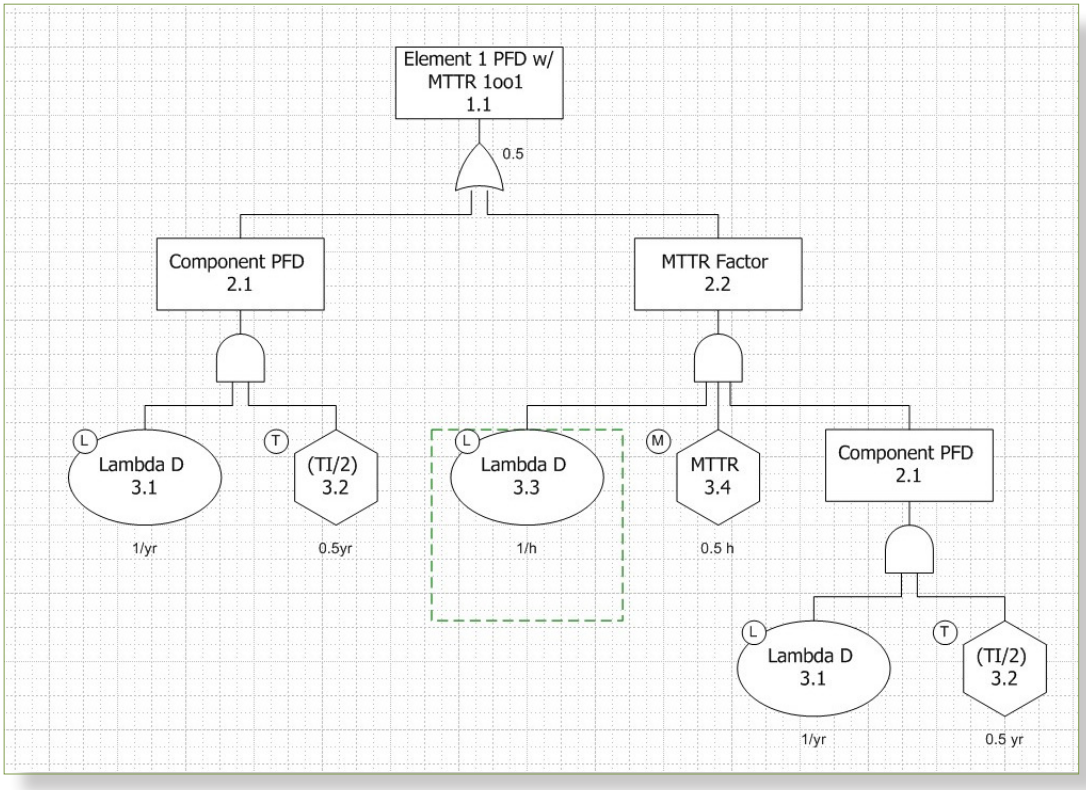
ioLogic™ Component

Risk analysis software for visual fault tree design

ioLogic™ is a unique software tool making it easy to create and edit fault trees for any purpose. ioLogic™ offers a "what you see is what you get" graphical user interface that instantly generates compact, pleasing new layouts whenever a user edits the tree.

Features of ioLogic™

- Automatically balance fault tree
- Supports industry standard gates
- Use several pre-formatted templates for SIL/SIS analysis
- Easy to customize the appearance and arrangement of fault trees
- Simple commands for pruning, cloning and grafting
- Easily add branches
- Supports mixed probability and frequency calculations
- Finds the best algorithm based on current tree status
- Detects repeated events
- Transfer and untransfer
- Based on Microsoft® Visio
- Manages failure rate database



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ioVu™ Component

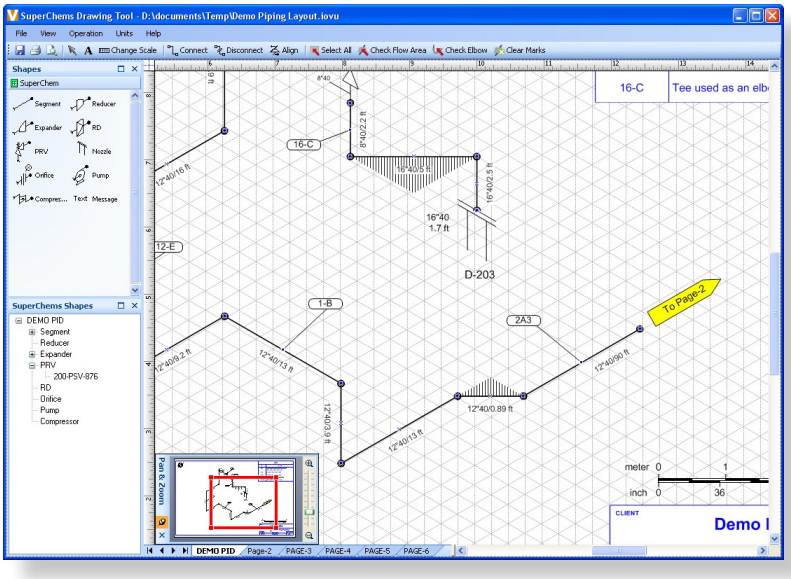
A better method for drawing piping isometrics

ioVu™ is a unique software tool making it easy to create and edit piping isometrics. It allows users to create new diagrams by dragging and dropping components to the canvas and connecting them.

ioVu™—Your Piping Isometric Solution

If you have tried to create a piping isometric by using other software, you know how difficult it can be to draw a skew for a pipe, to insert a component into a piping layout, or to align a piping layout after changing a component. ioVu™ allows these tasks and many others to be executed by simply clicking a menu item. ioVu™ takes care of the rest.

ioVu™ also provides an interface to input data for piping components. It has a flexible unit system which allows users to input data with any unit they choose. ioVu™ can also check data integrity automatically. In addition, ioVu™ can automatically generate piping diagrams from Process Safety Office® SuperChems™ component data without any user interaction.



Features of ioVu™

- Draw with or without scaling
- Draw skews automatically
- Draw valves automatically
- One click adjusts a component's angle
- Automatically generate labels and notes
- Easily create/edit table contents
- Draw a piping isometric over multiple pages
- Insert a piping component in the middle of a piping layout
- Delete a piping component and reconnect the piping components before and after it
- Auto-validate line size/schedule
- One click changes line size/schedule
- Can be saved as Microsoft® Visio file

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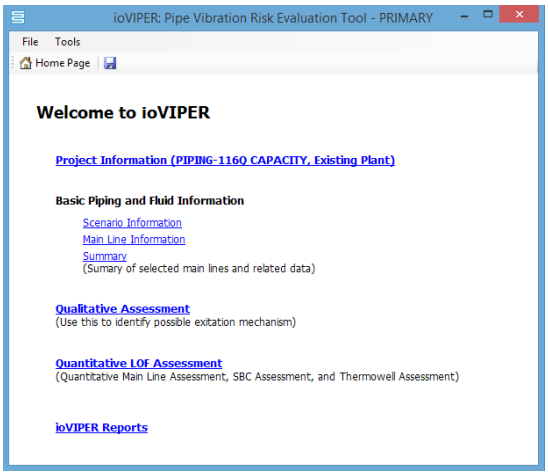
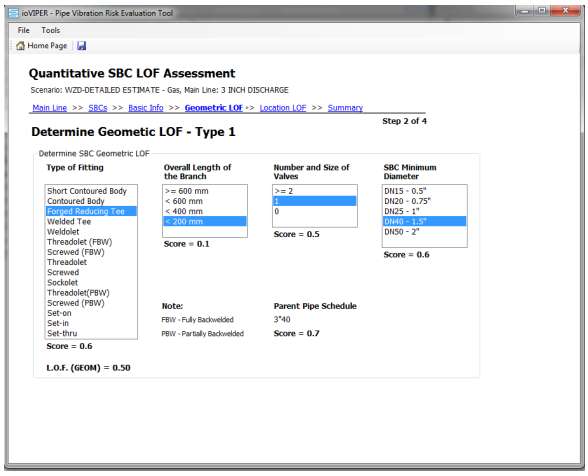
ioViper™ Component

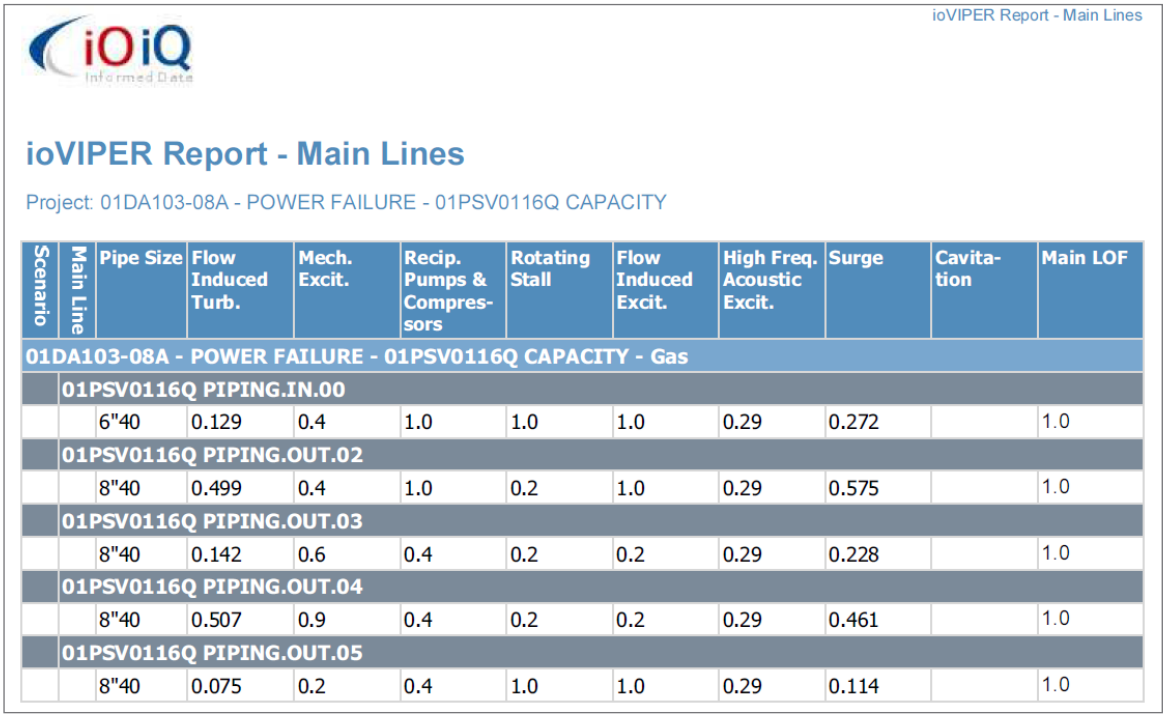
For pipe vibration analysis

ioViper™ is a software tool for evaluating vibration induced fatigue in process and relief pipework. The program utilizes the methodologies outlined in the 2nd edition of the "Guidelines for the Avoidance of Vibration Induced Fatigue Failure and Process Pipework" published by the Energy Institute.

The program is designed to automate the established methods and mitigation measures, considered for both new and existing process systems. As a component of Process Safety Office®, ioViper™ directly integrates with the SuperChems™ component where mechanical data and simulation fluid properties are readily available.







Scenario	Main Line	Pipe Size	Flow Induced Turb.	Mech. Excit.	Recip. Pumps & Compressors	Rotating Stall	Flow Induced Excit.	High Freq. Acoustic Excit.	Surge	Cavitation	Main LOF
01DA103-08A - POWER FAILURE - 01PSV0116Q CAPACITY - Gas											
	01PSV0116Q PIPING.IN.00										
		6"40	0.129	0.4	1.0	1.0	1.0	0.29	0.272		1.0
	01PSV0116Q PIPING.OUT.02										
		8"40	0.499	0.4	1.0	0.2	1.0	0.29	0.575		1.0
	01PSV0116Q PIPING.OUT.03										
		8"40	0.142	0.6	0.4	0.2	0.2	0.29	0.228		1.0
	01PSV0116Q PIPING.OUT.04										
		8"40	0.507	0.9	0.4	0.2	0.2	0.29	0.461		1.0
	01PSV0116Q PIPING.OUT.05										
		8"40	0.075	0.2	0.4	1.0	1.0	0.29	0.114		1.0

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ioSecure® Component

Security and vulnerability assessment tool

ioSecure® is an integrated application for assessing facility security and vulnerability. You are able to submit applications through a secure platform, quickly and confidently, helping to optimize your productivity demands safely, securely and swiftly.

User-Defined Component

Customize Process Safety Office® with your own User-Defined component

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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**

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

TÜV NORD TUV USA Inc. ISO 9001:2015