

EXCELLENCE THROUGH INSIGHT

**INGENERC**



Ingenero enables clients to quickly and cost-effectively expand their technical human resource base by globally leveraging the best available engineering and scientific graduates from top universities in India and the United States.

The company is guided by an internationally respected leadership team with principal offices in Houston, Texas and Mumbai, India. Ingenero offers both remote, as well as onsite technical teams that have yielded profitable results for many well-known clients throughout the world.

As a high-end engineering service provider, Ingenero offers a complete operating solution that combines leading edge technology with a best practices approach where highly-qualified engineers routinely maximize client profits.







## INGENERC

A high-end engineering and applied technology company providing technical resources and services for prominent engineering and processing clients.

### ►►► TECHNICAL RESOURCES

#### ■ Project Specific Contract Engineers (all disciplines available in pool)

- General engineering services and support
- Design and simulation projects

#### ■ Dedicated Technical Teams (engineers, scientists, statisticians)

- Engineering teams staffed to client specifications
- Technical teams for remote support of client operations
- Product and technology development teams

### ►►► CONTINUOUS ASSET PERFORMANCE IMPROVEMENT SERVICES

#### ■ Remote Monitoring

- Equipment, facilities, logistics, processes
- Environmental monitoring (emissions, air, water, soil)

#### ■ Model Feedback

- Linear and non-linear programming solutions
- Feedstock / Price / Production / Energy Trade-Offs
- Stochastic modeling

#### ■ Energy, Yield, and Throughput Optimization

### ►►► TECHNICAL CONSULTING AND DESIGN PROJECTS

#### ■ Energy Audits

#### ■ Pinch Analysis

#### ■ Debottleneck Studies

#### ■ Basic Engineering Package

#### ■ Relief System Engineering and Risk Analysis

#### ■ Operator and Engineer Training

#### ■ HAZOP, HAZID

#### ■ Strategic and Operations Planning Model

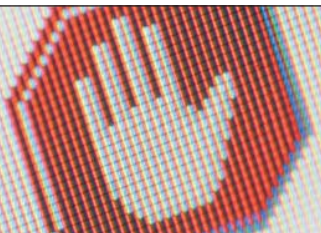


A photograph of an industrial facility, likely a refinery or chemical plant, at dusk. The sky is a deep blue with a hint of orange from the setting sun. Several tall, dark structures, including distillation columns and storage tanks, are silhouetted against the sky. Some of these structures have bright lights at their tops and along their sides, creating a stark contrast with the dark environment. In the foreground, there are more complex structures, including what appears to be a large storage tank or reactor, and various pipes and walkways. The overall scene conveys a sense of industrial activity and scale.

INTEGRITY

QUALITY

RESULTS



# Ingenero Confidentiality and Security of Information

The Ingenero business model (IPOG™) requires its engineers to analyze daily operating plant data and suggest optimal operating conditions in the backdrop of production and marketing constraints. To ensure that significant value addition takes place through this IPOG™ service and the one-off in-depth engineering studies undertaken by Ingenero, it is imperative for Ingenero's clients to allow Ingenero engineers to access sensitive plant information such as manufacturing process details, raw material and utility unit consumption figures, etc. In today's fiercely competitive business environment, every player is paranoid about maintaining its competitive advantages. This naturally gives rise to a concern regarding leakage of sensitive business information into the public domain.

Ingenero enters into a confidentiality agreement with every customer. Ingenero management recognizes the importance of closely guarding customer data. Systems have been put in place to achieve this. Some of its salient features are as follows:

## **1.0 Confidentiality clause in service agreement with employees**

Ingenero has a service agreement with each of its employees. This service agreement has a confidentiality clause, which restricts the employees from disclosing client information to third parties, not only during the tenure of their service with Ingenero, but also for a substantial period of time after engagement is over.

## **2.0 Restricted distribution of customer information**

At the beginning of every new project, a separate Project Team is formed and one person is nominated as the Project Team Leader. Team members work exclusively on the assigned project. The Project Team Leader is the custodian of all information received from the customer and is responsible for safeguarding the information.

## **2.1 Start-up phase**

During the set-up phase, plant information is received in two different forms, namely hard copies (prints) and soft copies (electronic). A comprehensive log of all incoming documents is maintained in the Documentation Centre (library).

### **2.1.1 Control over hard copies of documents**

All hard copies (prints) are received in duplicate. One copy is kept in the custody of the Project Team Leader, who is entrusted with the responsibility to ensure that the information is made available only to his/her team members on a "need-to-know" basis. The second copy is labeled as "Master Copy" and is kept under lock and key in the Documentation Center. This Master Copy serves as a back-up, if the working copy gets mutilated due to use. The person in charge of the Documentation Center is authorized to give the Master Copy only to the respective Project Team Leader. Ingenero has consciously abstained from putting up any photocopying facilities in its office to prevent clandestine unauthorized copying of documents.

### **2.1.2 Control over soft copies**

The IT administrator creates a separate directory for every project. In consultation with the Project Team Leader, the IT administrator decides the type of access to be given to each team member (read only access OR read & write access OR full access). Everybody else outside the core project team is denied access to the project folder. All soft copies are stored in the project folder and are password protected.

## **2.2 Regular data transfer between client site and Ingenero office**

Once a project goes live, daily operating data and logs are transmitted from the customer's plant to Ingenero office via the internet. Different modes of data transfer are used, depending upon customer preference and the hardware and



## Ingenero Confidentiality and Security of Information

**(CONTINUED)**

software available at the customer's end. Ingenero provides customized VB scripts to capture tag readings from the customer's DCS system historian into Excel files. Some documents are scanned at the customer's end and made available in PDF format. All these Excel & PDF files are then sent to Ingenero as email attachments or loaded on to password protected FTP sites or accessed by Ingenero remotely through a secured VPN connection. VB scripts at Ingenero's end ensure automatic uploading to the respective project folders.

### **2.3 Security measures**

**2.3.1** All the domain users have authentication by user name and password. The passwords are changed every fortnight.

**2.3.2** Folders containing data from clients have coded names so that the identity of the client is not revealed. Data files received from clients also have code names. The data files contain only tag names, values and time stamps. Without a complete tag list, units of measurement and understanding of the location and type of meter, these raw numbers would be meaningless to any intruder.

**2.3.3** Entry to the server room is restricted and only authorized IT personnel are allowed inside. All the entries to the Server room are logged.

**2.3.4** All the PCs and servers have McAfee Antivirus protection, which is updated automatically.

**2.3.5** All the IT hardware is powered through a 40 KVA UPS having one hour battery backup.

**2.3.6** Data from servers is backed up into DAT tapes, which are then kept in the custody of the IT administrator. A second back up is taken on Compact Discs (CDs) and stored at a safe location away from the office premises. Access to these premises is restricted to the Documentation Center in-charge.

**2.3.7** Firewalls are in place to protect the data from being hacked by unauthorized outsiders.

**2.3.8** As an additional precautionary measure, Ingenero offers exclusive data servers to clients who wish to have one at an extra cost.

**2.3.9** Employees and visitors are barred from carrying floppies, Compact Disks (CDs), Pen drives and such other data storage devices into or out of the office premises. Checking the contents of personal handbags and frisking by security personnel at the exit gate ensures that this rule is followed in earnest.

**2.3.10** Internet access is provided only to select people and that too from designated PCs only. A log of all incoming and outgoing emails is maintained for all users and the IT administrator monitors it periodically.





# Engineering and Construction

**Ingenero provides engineers to Engineering & Construction (E&C) companies. Ingenero's engineers work on specific tasks, long-term projects and function as a complete dedicated value engineering group. Ingenero's well-educated, experienced engineers bring insight, speed, and lower cost differential to E&C companies' offerings.**

## Value and Partnership

For many E&C companies, the availability of high-caliber engineers at a fraction of Western rates is the initial attraction to Ingenero. For other companies, it is the partnership approach taken by Ingenero to function as an extension of their client and consistently deliver a quality product.

## Global Resources for a Global World

Ingenero has teams of engineers dedicated to specific clients to provide the specialty engineering services offered by their clients. These services are delivered all over the world by these teams, who function as a seamless part of their engineering clients. Some of these teams have started from only a few engineers and are now quite sizable.

## Communication is Key

Ingenero understands the critical importance of communication. Typically, daily reports are issued on progress made that day. Schedules are laid out and performance to the schedule closely tracked. Conference calls range from daily to weekly depending on the project. Large files are handled with FTP sharing. If desired for large projects, Ingenero can provide an onsite person to help manage communication within a project or provide office space in India for a client manager on those projects best suited to be handled with a complete engineering team from Ingenero's cost-effective technical hub.

## Engineering

Ingenero's engineers are experienced in application of codes, standards and statutory requirements. The expertise of the engineering group is built on their considerable experience in many industries. Engineering talent is available for project management and process, piping, mechanical, instrumentation, electrical and civil engineering. Experienced staff, systems and procedures along with appropriate tools provide a dependable product for clients.

Ingenero believes in applying technology to tasks wherever possible and delivering a thoroughly analyzed product. In addition to standard E&C disciplines, Ingenero has specific groups dedicated to process simulation and mathematical modeling.

## AT A GLANCE

### Ingenero's E&C

- Short-term Personnel (onsite or offsite)
- Project Specific Tasks
  - Heat Exchanger Design
  - PSV Studies and Design Projects
  - Revamps
  - Process Studies
  - Pinch Analysis
- Foreign Deputation as Needed
- Basic Engineering through Commissioning and Operation
- Highly-educated Engineers
- All Engineering Disciplines Available
- Dedicated to Specific Client



# Process Simulation and Mathematical Modeling

**Process Simulation and Mathematical Modeling Services are among Ingenero's core technical consulting and design offerings. Ingenero is an international leader in simulation and modeling for the energy (upstream and downstream) and petrochemical industries. Our services maximize throughput, efficiency, and yield for clients throughout the world.**

## **Ingenero's Process Simulation - Steady State and Dynamic**

Ingenero delivers robust simulation models that are extensively used by clientele as predictive indicators to enhance critical decision making and greatly contribute to de-bottlenecking. Ingenero provides both rigorous thermodynamic models and empirical models, depending on the process. Ingenero uses simulation models to provide services including troubleshooting, corrosion studies using ionic modeling, thermal pinch analysis, pressure relief and flare systems rating and design, dynamic simulation, and process simulation software testing. Training is a component of many of Ingenero's offerings. With dynamic simulation, for instance, Ingenero conducts offline training of board operators and field operators to produce long-term plant performance improvements. Dynamic simulation is also utilized by Ingenero for the development and tuning of APC control systems.

## **Linear and Non-Linear Programming**

Ingenero helps clients optimize inventory, production, blending, and supply chain issues to maximize profits. Planning, scheduling and other operations are mathematically modeled per client constraints to maximize profits.

## **Heat Exchangers**

Ingenero provides design and rating services for shell and tube exchangers, as well as specialty designs (e.g. twisted tube etc.). Ingenero can also monitor heat exchangers to optimize ongoing performance in addition to setting cleaning schedules.

## **Furnaces**

Ingenero's furnace modeling services have consistently maximized productivity and minimized downtime for clients. In a recent project, Ingenero was tasked with determining the maximum capacity of a cracking furnace for olefins production. Ingenero found that the furnace could operate at 118% of the current throughput, all while meeting the capacity constraints of the associated equipment. Ingenero models furnaces using empirical and specialized furnace software models. This includes furnace modeling for refinery units and crackers, as well as detailed thermal and hydraulic analysis.





# Compliance Monitoring Program

**Ingenero's Compliance Monitoring Program (CMP) is a comprehensive approach to continually monitoring and fulfilling Health, Safety, and Environmental (HSE) regulatory compliance obligations.**

## **Ingenero's Compliance Monitoring Program (CMP)**

Ingenero's Compliance Monitoring Program (CMP) is a holistic approach toward compliance monitoring that encompasses Water/Waste Management, Air Quality Management and Carbon Management Services. Ingenero's approach involves strategic planning; risk-based targeting; data integration, management, and analysis; inspections and monitoring; and compliance support.

### **Water/Wastewater Management**

Among Ingenero's Water/Wastewater Management Services:

- Permitting and Compliance
- Spill Prevention Control and Countermeasures
- Storm Water Segregation and Treatment

Ingenero also handles a multitude of effluent treatment system issues, such as design, startup, operation, troubleshooting, and optimization. Additionally, Ingenero deals with the permitting and regulatory issues, and identifying generation reduction opportunities for solid and hazardous wastes as well as wastewater.

### **Air Quality Management**

Among Ingenero's Air Quality Management Services:

- Developing, Reviewing, and Amending Operating Permits
- Monitoring, Recordkeeping, and Reporting for Regulatory Compliance Requirements
- Selecting, Evaluating and Optimizing Control Technology
- Assessing, Modeling and Planning Risk Management

### **Carbon Management Services**

Ingenero advises on carbon management. Ingenero's involvement in carbon management encompasses development of a Green House Gases (GHG) emission profile and inventory, which serves as a baseline for annual GHG emissions verifications. Ingenero bridges the gap between baseline and verification by creating a path toward regulatory compliance through energy audits and continual monitoring.



## Process Engineering

**Ingenero's top-tier process engineers focus on high-end solutions and services.**

**Ingenero's Process Engineering offerings encompass Model Building, Conceptual Design, Basic Engineering, and Detailed Engineering.**

Ingenero's highly educated and well-trained engineers have considerable process engineering experience, often more than 20 years, in multiple industries. Ingenero's pool of hundreds of engineers has worked in numerous industries, including oil and gas, refining, petrochemical, pharmaceutical, fertilizer and fiber. Ingenero's engineers are hand picked from the worlds' top universities. Both onsite and off, Ingenero's engineers have successfully worked on projects in the United States, Japan, Europe, the Middle East, South East Asia, India and more.

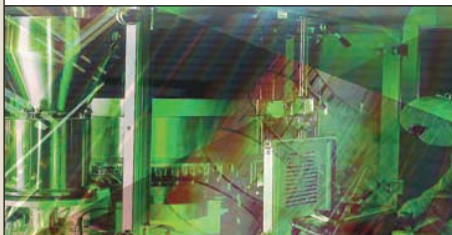
### AT A GLANCE

#### Ingenero's Process Engineering

- Conceptualization of Process Schemes
- Steady State Simulation
- Dynamic Simulation of Transient Operations
- Material and Energy Balance
- FEED
- Basic Engineering
- De-bottlenecking
- Equipment Design and Rating







# Relief System Engineering and Risk Analysis

**Ingenero offers extensive experience in pressure relief system analysis and design for operating plants. Our wide process design experience in pressure relief systems and engineering ensures correct sizing, selection and installation.**

## Ingenero works in many areas including:

- Design of new relief system
  - Audits of existing production facilities
  - Mitigation of existing relief system inadequacies
  - HAZOP studies

Ingenero focuses on ensuring adequate overpressure safeguards for equipment systems with identification of all probable overpressure sources. The overpressure protection for each system element is ensured and documented. Ingenero designs the pressure relief system based on commercial tools, in-house tools, industry standards, and guidelines. Documentation is designed to integrate with existing plant documentation systems.

### Design of new relief system

One of the most important activities in an EPC assignment is relief system design. Most often, because of schedule/delivery driven activities, the relief system design activities don't receive the necessary focused consideration. Ingenero assists EPC companies in the design and documentation of the relief system according to the company's guidelines and documentation requirements enabling EPC companies to focus on schedule and delivery driven activities. Our dedicated team of engineers ensures seamless operation between an EPC company and Ingenero.

### Audits of existing production facilities

Ingenero provides services designed to assist you with the sizing and selection of relief devices and can provide the complete design documentation for your plant's relieving system. In addition, Ingenero is prepared to provide mitigation study capabilities. Simulation model can be generated to match with the existing feed rate of the plants, which forms a basis for relief system study and generate documentation as per existing plant documentation systems.

### Mitigation of existing relief system inadequacies

Often the EPC firm size relief devices/systems based on a certain basis/assumptions, which can be inadequate once a plant's operating philosophy changes. Ingenero's experienced team can mitigate inadequate relief devices/systems by generally recognized and adequate best engineering practices to eliminate unnecessary modifications to the plant, saving cost and downtime for the plant.

### Work flow for relief system analysis

- Establish design basis for the study
- Simulation for mass and heat balance
- Data collection for equipment and piping
- Verification of equipment in field
- Identification of all credible scenarios
- Calculation of all credible scenarios
- Size and select pressure relief device
- Flare header analysis
- Mitigations
- Documentation



# Intelligent Process Operations Guidance Solution (IPOG)<sup>™</sup>

**Ingenero's Intelligent Process Operations Guidance (IPOG)<sup>™</sup> Solution is a state-of-the-art, technology-enabled, profit-enhancing service combining experience, technology and methodology to generate optimal operations and maximum returns.**

## The IPOG Advantage

Ingenero's IPOG captures millions of dollars of benefits that are often lost by operating below true potential. IPOG enhances returns on existing capital investment by guiding facilities towards optimal performance.

## IPOG Data Analysis

Ingenero's daily IPOG solution begins by modeling a plant's process and analyzing available data. Digital data is encrypted for transmission over the Internet to Ingenero's highly secure information infrastructure. Once the data is compiled, Ingenero immediately begins analysis. More specifically, this includes data mining and review, reconciliation (when needed), simulation inputs, multivariate statistical analysis, and overall process analysis. From this in-depth analysis, Ingenero produces customized daily reports with actionable recommendations to close the gap between current operations and thermodynamic optimal.

## IPOG Implementation Support

Ingenero's team guides the facilities' managers in interpreting and implementing the suggested recommendations. From direct board operator conversations, planning and scheduling, and long-term opportunity identification, to design and implementation of major capital projects; Ingenero works with operating companies to achieve and maintain breakthrough performance.

### AT A GLANCE Ingenero's IPOG

- Increased Throughput and Yield
- Energy Savings
- Continuous Process Surveillance
- Decision Implementation Support
- Data Processing, Analytics and Interpretation
- Planning and Scheduling
- Implementation Support





## Technical Resources

**Ingenero provides global technical resources for a global world. Ingenero, which is internationally recognized as a top engineering and applied technology firm, offers high-caliber personnel, advanced technology, and best practices methodologies in designing new facilities and optimizing existing operational process facilities, as well as a pool of engineering and scientific talent from a broad scope of disciplines.**

### Full-service Engineering Talent Firm

As a full-service firm, Ingenero's offerings encompass engineering disciplines, such as process, electrical, instrumentation, mechanical, civil and specific engineering sub-specialties, scientists, statisticians, and mathematicians rounding out Ingenero's capabilities and push ideas and projects further.

### Remote or Onsite

Ingenero brings these resources to a variety of companies. Ingenero can function as a project team or as a seamless part of company either through remote technical services or a dedicated, onsite technical services team.

### Simulation and Modeling

For process simulation and mathematical modeling software companies, Ingenero has:

- Provided customer training and support
- Built and maintained models for clients
- Tested and benchmarked software to competitors

### Operating

For Operating companies, Ingenero has provided:

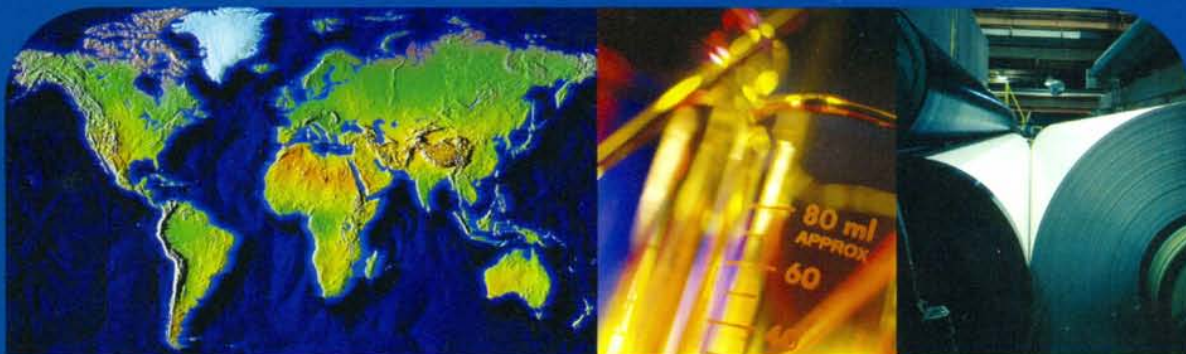
- Specific studies
- Basic engineering design
- Complete technical resources group
- Research and Development tasks for projects

### Engineering and Construction

For Engineering and Construction companies, Ingenero has:

- Handled specific tasks of major projects
- Served as the engineering team for long-term projects
- Provide ongoing engineering services as a client dedicated team





**INGENERO**

[www.ingenero.com](http://www.ingenero.com)

*ingenero* - Latin. To generate.



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