

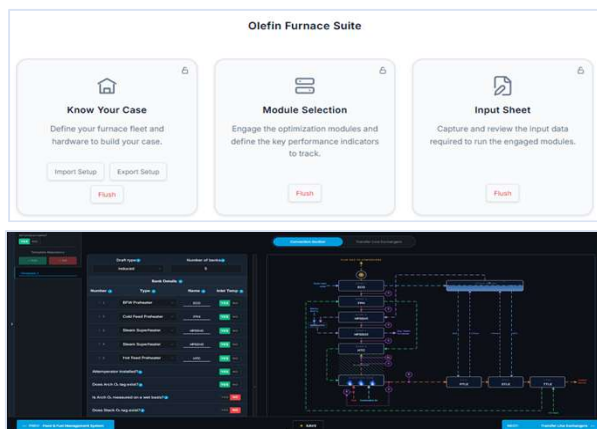
PRODUCT OVERVIEW

FurnaceX360 is a decision-support application for the Olefin Unit. Domain and ML agents are configured on the unit's own historian and Sensor tag data, covering the Optimization – Overall yield maximization and furnace run length optimization along with the forecast, Furnace critical KPIs calculation, Draft & Damper Optimization, Burner performance optimization, Tube Plugging probability, TLE & convection bank performances and Decoke effectiveness improvement. Output reaches the process engineer as ranked, quantified actions, each reported against the parameter that caused it. Every model agent is configured, validated and commissioned per site by Ingenero process engineers, so the deployment reflects that unit's configuration and operating envelope.



01 Unit Configuration

Shown: Olefin furnace suite – interactive configuration, modules and sensor entry

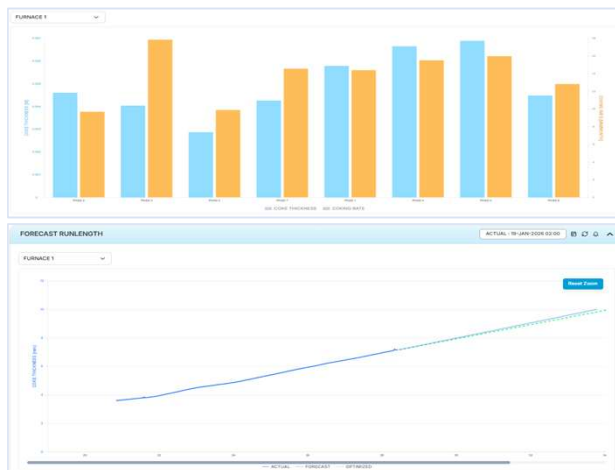


- Know Your Case** Configure your furnaces from feed type, radiation, convection, burner and coils
- Module Selection** After configuring all furnaces, select the modules – Domain & AI agents
- Input Sheet** Based on configuration & Module selection – relevant sensor info needs to be filled
- Interactive Config** Radiation, Convection, Feed header and Saturator interactive PFD available



02 Plant Data and Model Execution

Shown: coke thickness & coking model, run length forecast current vs optimum.



- Inputs** Sensor tag entry along with design tag values with configuration details
- Processing** tag validation, steady state framing and furnace run identification
- Outputs** predicted KPIs, ranked actionable with cause, trends, alerts



03 AI-Powered Model Agent Suite

Agent/Module selection shared along with detailing of the olefin specific details

- Thermal & Fuel Efficiency** Helps to compare the energy efficiency among the furnaces.
- Environment KPIs** Estimate thermal and fuel NOx and warns for higher limit breach.
- Decoke Efficiency** Provide efficient decoke tracking and suggestions for improvement
- Tube Plugging** Estimates plugged tubes and warns early for the corrective action.
- Run Length Forecasting** Forecasted value helps to do decoke scheduling along with biasing option
- Feed Planner** Helps to plan feed based on future feed availability
- Fouling Precursor** Soft sensor estimates precursors that cause fouling in CGC/Quench loops

KPI Selection

Module Selection

Calculation Package
 Core thermal and process calculations that drive every downstream module.
 ENGAGED

Rigorous Optimizer
 First-principles optimization across firing, feed and duty constraints.
 ENGAGED

Runlength Optimizer
 Trades severity against coking rate to extend the run to its target date.
 ENGAGED

Runlength Forecasting
 Projects remaining run life from live fouling and skin-temperature trends.
 ENGAGED

Tube & Burner Health
 Per-tube skin temperature, flame quality and burner imbalance detection.
 ENGAGED

TLE & Convection Health
 Transfer-line exchanger fouling and convection-section duty tracking.
 ENGAGED

Live Benchmarking Model
 Continuous gap analysis against best-achieved and design performance.
 ENGAGED

Insights & Suggestions
 Ranked operator actions with the expected margin impact of each.
 ENGAGED



04 Opportunity and Operator Actions

WORKFLOW

FURNACE 3 > > > LOW ETHYLENE PRODUCTION IN FURNACE 3

DEVIATION TIMESTAMP: JUL 2, 2026 10:45:00 AM

LAST OCCURRENCE: JUL 2, 2026 10:50:48 AM

CAUSE: LOW FEED FLOW IN FURNACE 3

ACTUAL: 64.96

OPTIMUM: 66.96

SUGGESTIONS: CONSIDER TO INCREASE FURNACE 3 FEED FLOW UP TO OPTIMIZED VALUE.

OPTIMUM: 66.96

AFFECTED KPI	ACTUAL KPI VALUE	OPTIMUM KPI VALUE
LOW ETHYLENE PRODUCTION IN FURNACE 3	64.96	66.96

ADDITIONAL ACTIONS TAKEN

FORWARD

REJECT ALERT

CONFIRM IMPLEMENTATION

FORWARD TO:

SATYAM SHARMA

SUBMIT ACTION

WORKFLOW LOGS

JUL 2, 2026 10:50:48 AM

SHARMA, SATYAM

EVALUATE

TEST UPDATE

ACCEPT

JUL 2, 2026 10:50:48 AM

SHANMUGA, RAHUL

REVIEW

REJECT FOR DEV TEST

ACCEPT

JUL 2, 2026 10:50:48 AM

SHARMA, SATYAM

REVIEW

REJECT FOR DEV TEST

ACCEPT

CURRENT STATUS

OVERDUE

OPPORTUNITY

PRODUCTION OPPORTUNITY (MT/Day)

15.7

ENERGY REDUCTION OPPORTUNITY (GJ/Day)

21.5

CO2 REDUCTION OPPORTUNITY (MT/Day)

0.5

OVERVIEW

PERFORMANCE KPIs

ETHYLENE PRODUCTION (MT/Day)

4044 4060

THERMAL EFFICIENCY (%)

91.5 91.5

SPECIFIC CONSUMPTION (GJ/MT)

1.26 1.25

SPECIFIC ENERGY CONSUMPTION (MT/Day)

4.517 4.515

TREND ANALYSIS

Performance KPIs

ETHYLENE YIELD (%)

ETHYLENE YIELD

ETHYLENE YIELD

+1-2%

Overall Ethylene Yield
from overall furnace system optimization

+10%

Furnace run length
optimum feed and COT adjustment

5-8%

Decoke effectiveness
pass level decoke optimization wrt burning

Basis: optimization takes care of constraint/limitation of not only at furnace level but also downstream section, suggestions take care of step change which ensures smooth implementation.

05 Platform

Historian connectivity
plug and play with leading plant historians

Simulation integration
third party simulators integrate without custom work

Daily reporting
downloadable daily reports with interactive trends

Gen AI assistant
answers plant questions in the operating workflow

Build your own dashboard
engineers build the views their unit needs

DELIVERY

Configured, validated and commissioned by Ingenero process engineers.

FLEXIBILITY

Any crude slate; selectable KPI set; selectable Virtual analyzers

SCALE

Repeat sites reuse the configuration, with no/minimal rework per plant.

Contact for a free trial: marketing@ingenero.com