polymerX360

Predictive decision support for polymer units

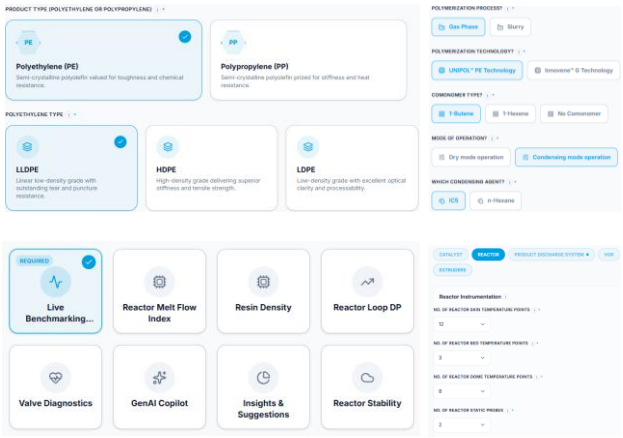
MODULE OF THE INGENEROX360 AI SUITE

PRODUCT OVERVIEW

PolymerX360 is an AI-powered decision-support application for PE/PP units that analyzes historian and DCS data to benchmark plant performance and identify optimization opportunities. It generates ranked, quantified recommendations across reactor optimization, hydrogen/co-monomer balance, condensation control, recovery systems, and extrusion efficiency—tailored to each plant's technology, grade slate, and operating envelope.

01 Unit Configuration

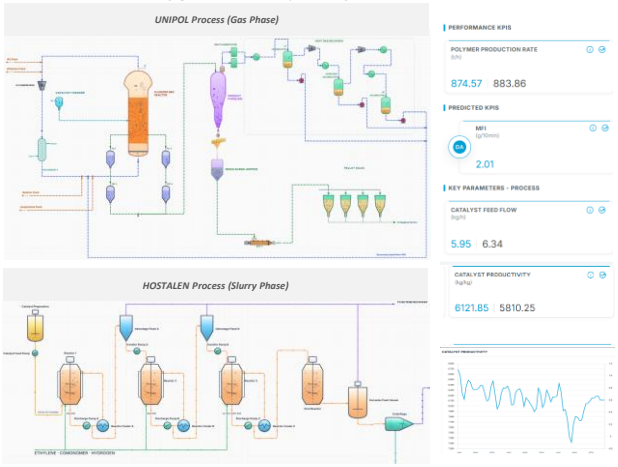
Shown: polymer technology, model suite selection and asset configuration.



Asset hierarchy	*feed handling, reactors, separation/recovery, extrusion and utilities*
Process units	*reactors (cascade/loop/FBR), compressors, condensers and extruders*
Asset count	*reactor trains, extruder lines and auxiliary equipment, configured per site*
Operating modes	*condensed/dry mode, steady state and grade transition*

02 Plant Data and Model Execution

Shown: the configured unit as a process flow, with live KPIs and trends.



Inputs	*reactor conditions, feed and catalyst rates, hydrogen/comonomer ratio*
Processing	*tag validation, steady state framing, grade segregation*
Outputs	*predicted KPIs, ranked actions with cause, trends and alerts*

03 AI-Powered Model Agent Suite

A site enables only the models its assets and available data can support.

Live Benchmarking	*Benchmarks performance against historical best.*
Product Quality Soft Sensors	*Predicts resin properties in real time to improve grade control.*
Recovery Monitor	*Tracks recovery unit performance and quantifies losses.*
Asset Reliability	*Outlier detection flags anomalies and failure risk.*
Reactor Stability	*Flags sheeting, slurry settling, bed compression and plate fouling.*
Cycle Gas Loop Fouling	*Forecasts compressor DP rise to flag fouling before it limits throughput.*
Valve Diagnostics	*Tracks control valve health and ranks tuning gaps.*
GenAI Copilot	*Answers plant questions in the operating workflow.*
Insights & Suggestions	*Ranks quantified actions against the identified cause.*
Energy Optimization	*Targets unit energy use against current plant load and grade.*

04 Opportunity and Operator Actions



BUSINESS KPI	CAUSE MESSAGE	ACTUAL	OPTIMUM	SUGGESTION
	LOW REACTOR BED TEMPERATURE	85.8 °C	86.8 °C	INCREASE REACTOR BED TEMPERATURE TO IMPROVE POLYMERIZATION RATE WHILE MAINTAINING PRODUCT SPECIFICATION.
LOW PRODUCTION RATE	LOW ETHYLENE PARTIAL PRESSURE	16.8 bar	17.4 bar	INCREASE ETHYLENE PARTIAL PRESSURE TO IMPROVE CATALYST PRODUCTIVITY AND POLYMER PRODUCTION
	REACTOR COOLING MARGIN AVAILABLE	8	5	MARGIN AVAILABLE IN REACTOR COOLING CAPACITY. OPPORTUNITY TO INCREASE FRESH FEED TO INCREASE PRODUCTION BY UTILIZING THE AVAILABLE MARGIN.
LOW VGR RECOVERY	HIGH HP CONDENSER OUTLET TEMPERATURE	-1 °C	-10 °C	REDUCE HP CONDENSER OUTLET TEMPERATURE TO IMPROVE CONDENSABLE HYDROCARBON RECOVERY AND REDUCE VENT LOSSES.
HIGH SPECIFIC ENERGY CONSUMPTION	LOW EXTRUDER GATE VALVE OPENING	30%	35%	INCREASE EXTRUDER GATE VALVE OPENING TO REDUCE SPECIFIC ENERGY CONSUMPTION

Hydrocarbon Loss Reduction — 1–2% *from recovery-unit optimization*

Energy Reduction — 2–3% *extruder optimization*

Catalyst Consumption — 2–4% *from productivity benchmarking against historical best for same grade*

Off-Grade Reduction — 2–5% *from shorter, more repeatable grade transitions*

Basis: grade quality control through soft sensor, compressor and extrusion energy use, recovery-unit loss rate and catalyst productivity.

05 Platform

Historian connectivity
connects directly with leading plant historians

Simulation integration
third-party simulators integrate without custom engineering

Daily reporting
downloadable daily reports with interactive trends

GenAI Copilot
answers plant questions in the operating workflow

Build your own dashboard
engineers assemble the views each unit needs

DELIVERY
Configured, validated and commissioned by Ingenero process engineers.

FLEXIBILITY
Any grade slate; selectable KPI sets and virtual analyzers.

SCALE
Repeat sites reuse the configuration, with little or no rework per plant.

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