



BROCHURE

Unified Engineering

Conceptual, FEED and Detailed Engineering Design from one single data hub to increase design maturity and reduce project time, cost and risk.

Unified Engineering provides a single integrated platform for end-to-end facility engineering information from Process Simulation to 1D, 2D, and 3D design data for all phases of a project. Working from a common data platform, it enables efficient multi-discipline collaboration across project teams allowing them to focus on engineering tasks, not on time consuming information administration.

Having all data in a single environment inherently increases quality and timeliness of deliverables through consistency of data but even more importantly allows teams to assess and manage the impact of design changes in real time. This allows a process change to be almost instantly reflected in associated 3D models and equipment specs. With the ability to rerun Steady State and Dynamic process simulations as engineering data matures through Conceptual, FEED and Detailed Design phases the plant design can be continuously validated to ensure that cost and performance targets are maintained.

Unified Engineering: From concept to Digital Twin

Productivity in capital projects has stagnated for decades – the average capital project schedule lags by 20 months and goes over budget by 80%¹. AVEVA helps reduce Total Installed Costs (TIC) of capital projects by a minimum of 5%. Unified Engineering ensures you are in a stronger position to control project risks and cost overruns.

Unified Engineering will help you optimize your projects from conceptual design and FEED, right through to detailed design, creating new automated workflows to improve your change management process. Your business gains greater agility and increased efficiency to reduce risk and capitalizes on project execution.

With Unified Engineering, Process Licensors, EPCs and Operators can expect efficient and flexible workflows with better end-to-end collaboration and project control that saves time of up to 50% at the FEED stage, increases engineering efficiency by 30% and saves a minimum of 5% in TIC in the engineering and design phase alone.

The Unified Engineering Model

Unified Engineering consists of two main components, the Unified Lifecycle Simulation Platform (one model), and Engineering and Design (one database). The two are combined to form a robust process model and an engineering database that can synchronize through bi-directional flow of all 1D, 2D and 3D data from one platform.

The bi-directional integration of a steady-state and dynamic process model with an engineering database makes the process seamless and eliminates the need for MS Excel or other intermediate steps to transfer information between tools.

With the Unified Engineering you can have:

- One single version of the truth that remains up-to-date
- Verification that equipment and piping are properly sized
- Verification the plant will operate as expected, and that controls are properly configured

Integrating process design with multi-discipline engineering workflows reduces delays in getting the latest valid information from other disciplines. This in turn reduces the risk of unplanned rework and increases overall profits. It also improves collaboration between teams and information transfer to different disciplines.

The integration allows engineers to easily return detailed engineering data to the simulation in dynamic mode for controls checkout, safety analysis and operator training. With all the engineering data in one place, FEED projects become easier to control and manage. Engineers can review, update and generate their deliverables confidently and with ease using automated processes. Projects can be delivered on time and within budget.

Simulation

One single platform with interactive Process and Control Engineering instead of multiple point solutions



Unified Engineering

Engineering & Design

A single, data-centric platform for discipline engineers to work together on, keeping all 1D, 2D and 3D engineering data in one place

- Accurate and mature design deliverables
- Efficient collaboration and automated updates
- Bi-directional data flow
- Digital Twin Data Model



+50%

Faster FEED stage

+30%

Increased engineering efficiency

-20%

Reduction in project schedule

+5%

Saved on Total Installed Cost

The value and benefits of Unified Engineering

One single data hub with bi-directional workflow

- Validating design interactively with simulation
- Applications directly communicating with each other
- One single tag register
- Enter data once, reuse multiple times
- Integration from engineering to dynamic simulation

SimCentral Simulation Platform

- Replace point solutions with a single, multi-purpose process model
- Design, Rating and Dynamics modes in a single simulation
- Switch between modes anytime in any direction
- Extend model libraries with no programming
- Manage library centrally to leverage company standards

Lower Total Cost of Ownership (TCO)

- Keep it simple and deal with one supplier - AVEVA

- Single sign on cloud access to AVEVA Connect
- Single data environment
 - Lower implementation costs
 - Faster operational readiness
- Common licensing
 - On premises with CALM

Reduced Risk

- One supplier – AVEVA
- One point of contact instead of multiple third-parties to deal with any issues

Cost estimation and control

- Integration with proprietary cost estimation and control systems
- Produce consistent key data such as material take offs, weld counts and bolt ups, equipment and instrumentation count for input into estimation tools to generate material, and construction estimates



Process



Mechanical



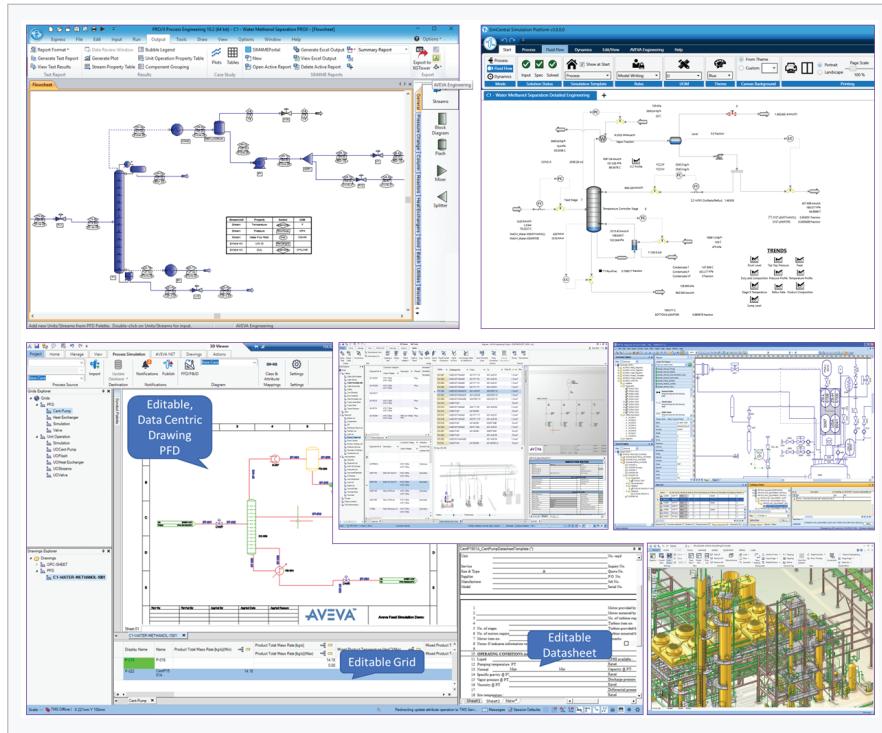
Drafting



Electrical



Instrumentation



The Unified Engineering environment allows for multi-discipline teams to collaborate across 1D, 2D and 3D from one data-centric location



Cost Estimation



Piping



Structural



Safety



Project Management

What Unified Engineering can do for you

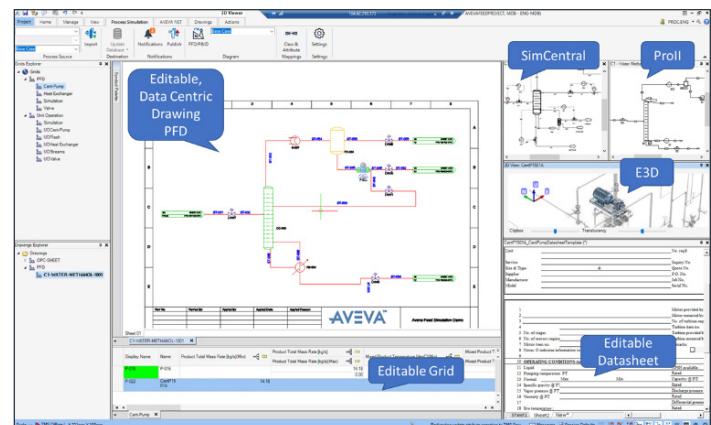
Break down silos

Unified Engineering breaks down the silos between process and engineering design. Each discipline maintains ownership of their data, and gains assurance that data from other disciplines is always correct and up-to-date. Early FEED is a highly iterative process but with Unified Engineering data is entered only once. The simulation data created in FEED is readily available for use in Detailed Design, increasing efficiency across stages. Procurement errors and delays are avoided, and rework caused by immature design deliverables is eliminated.

Leverage process simulation within the engineering process, interactively and controlled

New / greenfield projects

You can start off from a steady state process simulation and generate design cases for the various plant conditions and hand them off into the engineering



Process simulation data created in FEED is available for further use in detailed design

database. It is easy to compare various scenarios and select a governing case. The Engineering environment can be used to size equipment based on process conditions as Unified Engineering allows you to auto-generate all deliverables of the FEED / Basic Engineering Package such as Process Flow Diagrams, Line Lists and Equipment Data Sheets.

As your project progresses into Detailed Engineering the various engineering disciplines work on creating deliverables that may include equipment, piping, instrumentation, and controls etc. The equipment sizes are then provided back to Simulator, now in fluid flow and rating mode, to see how the plant will behave.

From here you can verify that the equipment and piping are the sized correctly:

- Valve positions and exchanger bypasses from actual valve Cv
- Column hydraulics and flooding from actual tray design
- Flare RV back pressures from 3D piping data
- Pump Curve operating point and Suction Head
- Compressor interstage injection/extraction from Pump

You then have the capability to switch to dynamic simulation mode in the simulator to verify that the plant will operate as expected and validate the control strategy:

- Controller Behavior
- Transient conditions
- Relief loads

Brownfield projects

For a brownfield project, you start from the engineering database and start the simulation loop by validating the design in simulator rating mode.

With the Simulator, you can switch back and forth between steady state, fluid flow and dynamic modeling, seamlessly, in one single process environment. Simulation changes made for Rating and Dynamics are automatically included in process simulation using SimCentral's unified model. Process simulations no longer need to be, "frozen" as you enter the Detailed Engineering phase. Change becomes an opportunity for improvement, not an element of risk.

Automated process validation of change

If a significant change needs to be made in engineering design, it will automatically flag in process so that the process engineer can validate the process or make modifications as appropriate.

All these changes are critical to the outcome of the project. Unified Engineering helps you check and validate change in real-time. This increases efficiency and productivity during the engineering phase of the project and ultimately lowers the level of risk at commissioning and start-up.

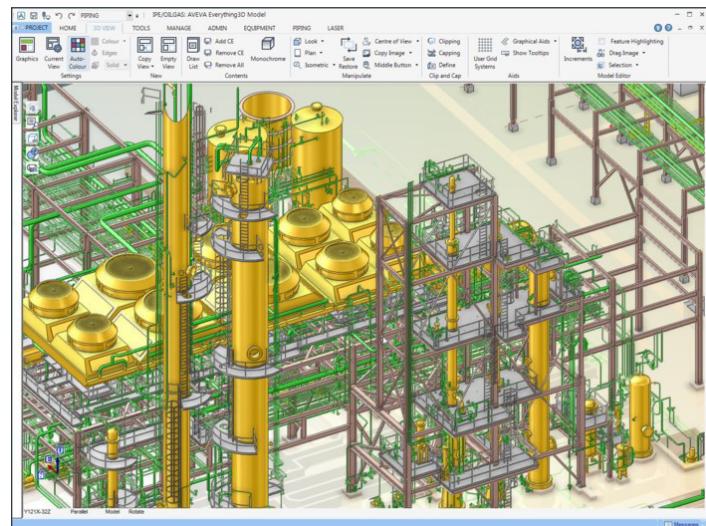
Dynamic Validation of Controls and Operator Training

Unified Engineering reduces the time and effort to return detailed engineering data to AVEVA simulation and run your process in dynamic mode.

3rd party control systems and safety logics are easily connected to the dynamic simulation so that you can quickly perform controls checkout, safety analysis, validation of operating procedures and operator training.

Integration with 3D Design

Unified Engineering uniquely integrates with 3D design to create high quality deliverables. This means that the full end-to-end suite of capabilities comes under one solution. Engineering data is managed together with the 3D and schematics data in the same project environment, alongside all object-centric information important to capital projects.



Unified Engineering integrates seamlessly with AVEVA E3D

Digital Twin deliverable to owner

Have your Digital Twin ready to handover to the Owner. Unified Engineering ensures your model is accurate and up-to-date throughout the project lifecycle. A Digital Twin of the plant ensures scope of high margin for EPCs and ease of start-up and operations for the Owner.



New Digital Business

Pursue new digital business deliverables in the market with a Unified Engineering platform developed for this purpose



Streamline Collaboration

Enable engineers to complete deliverables faster, and with greater maturity so that you can deliver your project on time and on budget



Reduce Cost, Risk and Delays

Minimize engineering errors and accelerate project execution:

- 50%⁵ faster FEED stage
- 30%⁶ increase in engineering efficiency
- 5%⁷ of TIC cost reduction in design phase alone



Maximize Margins

Reduce cost throughout capital projects while improving the quality and reliability of engineering deliverables

Book a demonstration

Capitalize on project execution

Organizations who rapidly and accurately communicate changes in the FEED and detailed design phase will be the most effective during procurement and construction to capitalize on project execution.

With Unified Engineering, Process Licensors, EPCs and Operators can expect efficient and flexible workflows with better end-to-end collaboration and project control that saves up to 50% faster FEED stage, 30% increase in engineering efficiency and saving a minimum of 5% TIC in the engineering and design phase alone.

About AVEVA

AVEVA is a global provider of Industrial software. We have 50 years of proven experience delivering plant and process modelling technologies. We are trusted by 19 of the top 20 petroleum companies; 22 of the top 40 chemical companies; and all 15 of the largest EPCs as our customers.

Book a demonstration: sw.aveva.com/campaigns/unified-engineering-demo

For more information about Unified Engineering please contact your local representative or visit our website: sw.aveva.com/engineer-procure-construct/unified-engineering