

# UniSim<sup>®</sup> Design Suite

## Product Information Note

Process modelling software for process design, simulation, safety studies, operations monitoring and debottlenecking, process optimization and business planning.

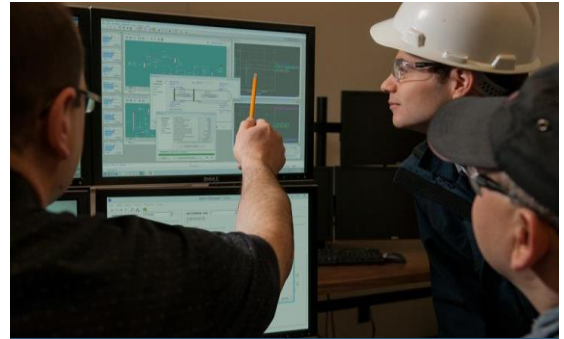
### The Challenge: Optimum Process Designs

Engineers in the oil and gas, refining, petrochemical and chemical industries must optimize their work to ensure safe and cost-effective process designs. Optimum designs must be accurately identified, to ensure companies comply with regulations and at the same time maximize their business performance. Process engineers are challenged with making timely business decisions while meeting the business objectives of designing and operating efficient, safe and profitable plants.

### The Opportunity: Linking Business Objectives to Process Design

UniSim Design process modeling is a powerful technology that enables decision makers and engineers to link critical business objectives to process design, by:

- Utilizing the same technology and process model throughout a project or plant asset lifecycle by different functions and for multiple purposes.
- Ensuring process equipment is properly specified to deliver desired product throughput and specifications.
- Performing 'what-if' scenarios and sensitivity analyses to identify the optimal design based on operating and business targets.
- Evaluating the effect of feed changes, upsets and equipment downtime on process safety, reliability and profitability.
- Improving plant control, operability and safety using dynamic simulation.
- Monitoring equipment/plant asset performance against expectations.



*De-bottlenecking Operations with UniSim<sup>®</sup> Design.*

As a true life-cycle simulation application, UniSim<sup>®</sup> Design Suite allows process models to be built, updated and used for multiple applications throughout a project or plant asset lifecycle. The same process model that is built for a feasibility study, can be re-used and updated for:

- Front-end engineering design
- Detailed engineering design
- Engineering studies
- Process de-bottlenecking
- Control and safety system check-out
- Advanced applications such as: Operator Training Simulator, Advanced Process Control, Asset Management and Operations Analysis and Business Support.

## WHY DO CUSTOMERS CHOOSE OUR SOLUTION?

### Best-in-Class Support

Our after-market services engineers, averaging 8 years of UniSim Support experience are:

- Responsive
- Knowledgeable
- Reliable
- With a solid process engineering background.

### Robust Technology

UniSim Design Suite technology is:

- Robust
- Scalable
- Stable
- Accurate
- Fast
- A Life-Cycle simulation platform.

### Innovation

Leveraging in-house process, control and software development expertise, we bring to market features:

- Developed with users
- For the users
- Adopting best practices & workflows recommended by the users.

### Joint-Development

We actively engage in joint programs with customers to:

- Address specific customer needs
- Accelerate development
- Pilot new technologies.

### Commercially flexible

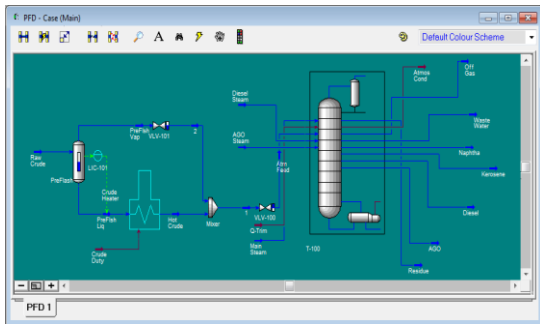
Flexible licensing model aligned with customer expectations in terms of:

- Product Options
- Access Type
- Contract length.

## The Solution: UniSim® Design Suite

UniSim Design Suite provides an accurate and intuitive process modeling solution that enables engineers to create steady-state and dynamic models for plant and control design, safety studies, performance monitoring, troubleshooting, operational improvement, business planning and asset management.

UniSim Design Suite helps process industries improve productivity and profitability throughout the plant lifecycle. The powerful simulation and analysis tools, real-time applications and the integrated approach to engineering solutions provided by UniSim Design Suite enables companies to improve designs, optimize production and enhance decision-making. These models may be leveraged into advanced training and optimization solutions provided by the UniSim® Operations and UniSim® Optimization suites.



PFD (Process Flowsheet Diagram) Modeling Environment.

## The Benefits

### Improved Process Designs

Engineers can rapidly evaluate the most profitable, reliable and safest design. It is estimated that on-site design changes made during commissioning constitute 7 percent of the capital cost of a project. UniSim Design enables engineers to evaluate the impact of their design decisions earlier in the project. For new designs, UniSim Design enables users to create models quickly to evaluate many scenarios. The interactive environment allows for easy 'what-if' studies and sensitivity analysis. The top candidates can be used to create high fidelity models, in which additional equipment and process details are included.

### Equipment/Asset Performance Monitoring

To ensure optimal equipment/asset performance,

UniSim Design allows users to rapidly determine whether equipment/asset is performing below specification. For example, engineers troubleshooting or improving plant operations use UniSim Design to assess equipment deficiencies such as heat exchanger fouling, column flooding, and compressor and separation efficiencies. Engineers engaged in retrofit work can quickly evaluate equipment employed in different services or evaluate the consequences of a design basis change.

### Reduced Engineering Costs

Simulating with UniSim Design reduces engineering costs by creating models that can be leveraged throughout the plant lifecycle, from conceptual design to detailed design, rating, training and optimization; providing a work environment that ensures work is completed quickly, effectively and consistently. This avoids the time-consuming and error-prone manual process of transferring, formatting and analyzing production and process data that can account for up to 30 percent of engineering time.

## Features

In order to operate with maximum effectiveness and provide the necessary insights and knowledge, a process modeling tool must combine ease-of-use with robust engineering power. UniSim Design is built upon proven technologies with more than 30 years' experience supplying process simulation tools to the oil and gas, refining, petrochemical and chemical industries. Features include:

### Easy-to-Use Windows Environment

PFDs provide a clear and concise graphical representation of the process flowsheets, including productivity features such as cut, copy, paste, auto connection and organizing large cases into sub-flowsheets.

### Comprehensive Thermodynamics

Ensure accurate calculation of physical properties, transport properties and phase behavior. UniSim Design contains an extensive component database and the ability to add user components or modify component properties. It also includes a pure compound database loader system which provides users with direct access to external compound property databases, such as DIPPR

*UniSim® Design Suite has an integrated steady-state and dynamics environment and is a true life-cycle simulation platform.*

UniSim® Design Suite supports open architecture through Active X, CAPE-OPEN and OPC compliance.

(Design Institute of Physical Properties), DDBST (Dortmund Data Bank), and GERG 2008.

It offers tremendous flexibility for users to choose compound properties from their preferred sources to meet their needs. A PVT Regression Import Tool reads PVT export files into UniSim Design. In addition a crude manager feature, allows the import and use crude assay databases from excel into UniSim Design. Also, a link to the Haverly H/CAMS crude manager allows the import of over 2000 crude assays, through the seamless interface between to two products. Finally, 3<sup>rd</sup> party thermodynamics can be used with UniSim Design through CAPE-OPEN 1.0 and 1.1.

### **Comprehensive Unit Operation Library**

UniSim Design supports process modeling of separation, reaction, heat transfer, rotating equipment and logical operations in both steady-state and dynamic environments. These models are proven to deliver quality realistic results and handle various situations such as vessel emptying or overflowing and reverse flow.

UniSim Design has extended the rotating equipment support to sub-sea unit operations, which include the Wet-Gas Compressor and the Multi-Phase Pump.

### **Active X (OLE Automation) Compliance**

Permits the integration of user-created unit operations, proprietary reaction kinetic expressions and specialized property packages and interfaces easily; with programs such as Microsoft® Excel® and .NET®.

### **Flexible License Manager**

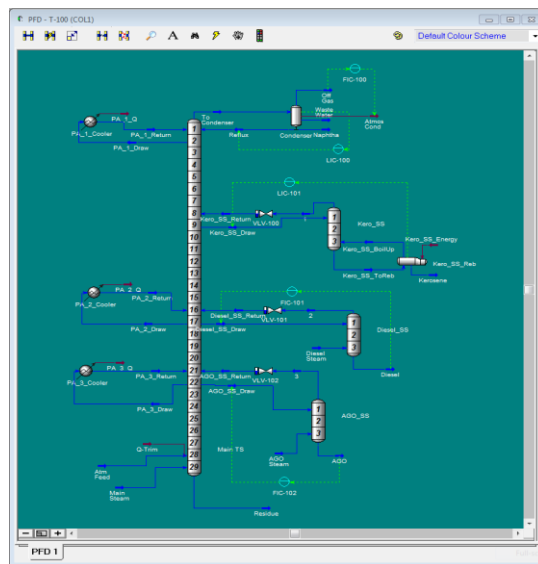
UniSim License Manager supports temporary license locking to laptop computers (commuting), token-based or hybrid (token-network) licensing models, and provides insightful administration tools for monitoring usage and managing access control.

### **Options**

UniSim Design Suite provides maximum flexibility and power to users by using an open architecture which enables industry-specific capabilities to be easily added by Honeywell or third-party suppliers. The following options are available for UniSim Design to help ensure client needs are met and enhance the use of simulation throughout the plant

lifecycle.

**UniSim Dynamic Option** provides dynamic simulation capability fully integrated with the UniSim Design environment. A steady-state model can be converted into a dynamic model which offers rigorous and high-fidelity results with very fine level of equipment geometry and performance detail. Special features for dynamic modeling include pressure-flow dynamics, a rich set of control functionality to support process control and detailed process monitoring, cause and effect matrices, and an event scheduler.



Crude Modeling in the UniSim Dynamic Option Environment

**UniSim Flare** is a steady state flare and relief network simulator used to design new flare and vent systems from relief valve to flare tip, or to rate existing systems to ensure that they can handle all possible emergency scenarios. UniSim Flare can also be used to debottleneck an existing flare system that no longer meets the need for safe operation in a plant.

**UniSim Blowdown Customize** is a dynamic simulation utility for blowdown studies. It allows for flowsheeting and event scheduling; it has a very detailed heat loss models for vessels and vessel heads and it implements the API 521 6<sup>th</sup> edition fire method.

**UniSim PRS** is new a standalone tool for sizing and rating PSVs and BDs and surrounding pipes. Originally a UOP internal tool, it is now commercialized and made available to UniSim

customers. The UniSim PRS interfaces with UniSim Flare for easier data transfer between the two products.

### **UniSim Spiral Wound Tube Bundle Option**

for accurate dynamic modeling of complex spiral wound tube bundle exchangers commonly found in LNG production.

**UniSim Design Gasifier Option** unlocks the gasifier operation block inside UniSim Design allowing the user to model these complex units in both steady state and dynamic modes.

**UniSim Heat Exchangers** is a suite of products that allow thermal specialists to design, check, simulate, and rate heat exchange equipment rigorously. Used on their own, they enable the determination of the optimum heat exchanger configuration that satisfies all process constraints. Integrated with UniSim Design, opportunities for capital savings in the overall process design may be identified. These products are the result of over 35 years of industry collaboration and research. The heat exchanger products offered in this suite include:

- Shell-Tube Exchanger Modeler
- Crossflow Exchanger Modeler
- Plate-Fin Exchanger Modeler
- Fired Process Heater Modeler
- Plate Exchanger Modeler
- FeedWater Heater Modeler
- Process Pipeline Modeler

**UniSim ExchangerNet** is an advanced tool for the design and optimization of heat exchanger networks. Utilizing advanced optimization technologies, ExchangerNet allows customers to perform pinch analyses as part of capital expenditure projects and ongoing operational optimization work. This leads to optimal process economics between capital and operating costs.

**UniSim ThermoWorkbench** provides users with the ability to create and analyze thermodynamic packages by regressing parameters against laboratory data and for analyzing the resulting predicted phase equilibria behavior. These packages may then be used in UniSim Design or other application using UniSim Thermo. UniSim ThermoWorkbench also allows users to perform azeotropic calculations for multiple compound systems, and to view results using a number of different graphical tools such as Txy and ternary phase equilibria diagrams.

**UniSim 3rd Party Options** are specialist technologies which complement the UniSim Design Suite through product integration.

Honeywell is a reseller for the following technologies:

- HTRI's XchangerSuite and XSimOp
- OLI's Electrolytes and Corrosion Monitor
- Schlumberger's AMSIM, BlackOil, Pipesys, and OLGAS
- AIChE's DIPPR 801 (2015).

In addition, UniSim Design links to a number of other technologies, such as:

- Schlumberger's OLGA and PIPESIM
- Petroleum Experts' IPM Suite
- CALSEP's PVTsim Nova
- Cost Engineering's Cleopatra Enterprise
- Haverly's H/CAMS
- KBC's Multiflash
- MySep's MySep
- MSE's Pro-M
- Siemens' COMOS
- Bentley's Axsys
- DDBST's DDBSP
- MS Excel
- Mathwork's Matlab/Simulink.

*UniSim® Design Suite provides the best technical solution in the market for process design customers, through own-developed products or partnerships with specialist 3<sup>rd</sup> parties.*

# UniSim® Design Suite R451 System Requirements

PARAMETER	SPECIFICATION
PROCESSOR SPEED	Minimum: Pentium III 700 MHz Recommended: Pentium IV 2.4 GHz or better
RAM REQUIREMENTS	Minimum: 768 MB RAM, 1 GB total memory (RAM + virtual memory) Recommended: 2 GB RAM, 4GB total memory (RAM + virtual memory)
DISK SPACE	Minimum: 500 MB of free disk space
DISPLAY	Minimum screen resolution: 1024 x 768 Recommended monitor size: 19 inch diagonal measure.
DESKTOP CLIENT OPERATING SYSTEM	Microsoft Windows 7, 8.x (Home, Business, Ultimate or Enterprise - 32 and 64 bit) Microsoft Windows 10 (32 and 64 bit)
SERVER OPERATING SYSTEM	Microsoft Windows Server 2008 Microsoft Windows Server 2012
DESKTOP WEB BROWSER	Microsoft Internet Explorer version 8 Microsoft Internet Explorer version 10
MICROSOFT OFFICE COMPATIBILITY	Microsoft Office 2013 Microsoft Office 2016 Microsoft Office 365
VIRTUALISATION COMPATIBILITY	VMWare EXSi

## UniSim® Design Suite

Honeywell's UniSim Design Suite, is part of the UniSim software family of online and off-line process design and optimization applications. Giving users the power to determine process workflows, equipment sizing and rating requirements, UniSim solutions help you capture and share process knowledge, improve plant profitability and maximize returns on investments in simulation technology.

UniSim Design Suite offers:

- An integrated steady-state and dynamics environment to easily re-use, update and transition the process models throughout a project or plant asset lifecycle.
- A user-friendly interface which helps engineers to easily access and visualize the process information and identify trends.
- Built-in industry standards that minimize the need for literature search when sizing and rating equipment.
- Integration with 3<sup>rd</sup> party specialty technologies which allow for the best technical solution for process simulation.
- Interfacing capabilities with process historians, DCS & safety systems, and other advanced applications that maximize the benefits for green-field, brown-field and revamp projects.

## UniSim Design Suite Support Services

This product comes with worldwide, premium support services through our Benefits Guardianship Program (BGP). BGP is designed to help our customers improve and extend the usage of their applications and the benefits they deliver, ultimately maintaining and safeguarding their advanced applications.

Honeywell provides a complete portfolio of service offerings to extend the life of your plant and provide a cost-effective path forward to the latest application technology. Honeywell services include:

- Standard and Customized Training
- Consulting
- Model Building
- Engineering Studies
- Custom Thermo/Unit Operations

## For More Information

Learn more about how Honeywell's UniSim Design Suite can improve process design, visit [www.hwll.co/uniSimDesign](http://www.hwll.co/uniSimDesign) or contact your Honeywell Account Manager or authorized distributor.

## Honeywell Process Solutions

1250 West Sam Houston Parkway South  
Houston, TX 77042

Honeywell House, Arlington Business Park  
Bracknell, Berkshire, England RG12 1EB UK

Shanghai City Centre, 100 Zunyi Road  
Shanghai, China 200051

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

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