BROCHURE

AVEVA E3D Design

The most advanced and powerful 3D design solution

AVEVA E3D Design™ is the world's most technologically advanced and powerful 3D design solution for the process plant, marine and power industries. It offers class-leading productivity and capabilities while retaining seamless compatibility with other AVEVA Engineering and Design solutions.

AVEVA E3D Design enables clash-free, multi-discipline 3D design, and rapidly generates accurate drawings and reports to reduce costs, timescales and commercial risks of both greenfield and brownfield capital projects.

Business Benefits

Easy to adopt

- Minimal staff training requirements and rapid ramp up to full productivity
- Ready global availability of AVEVA designers and system administrators

Rapid project start-up

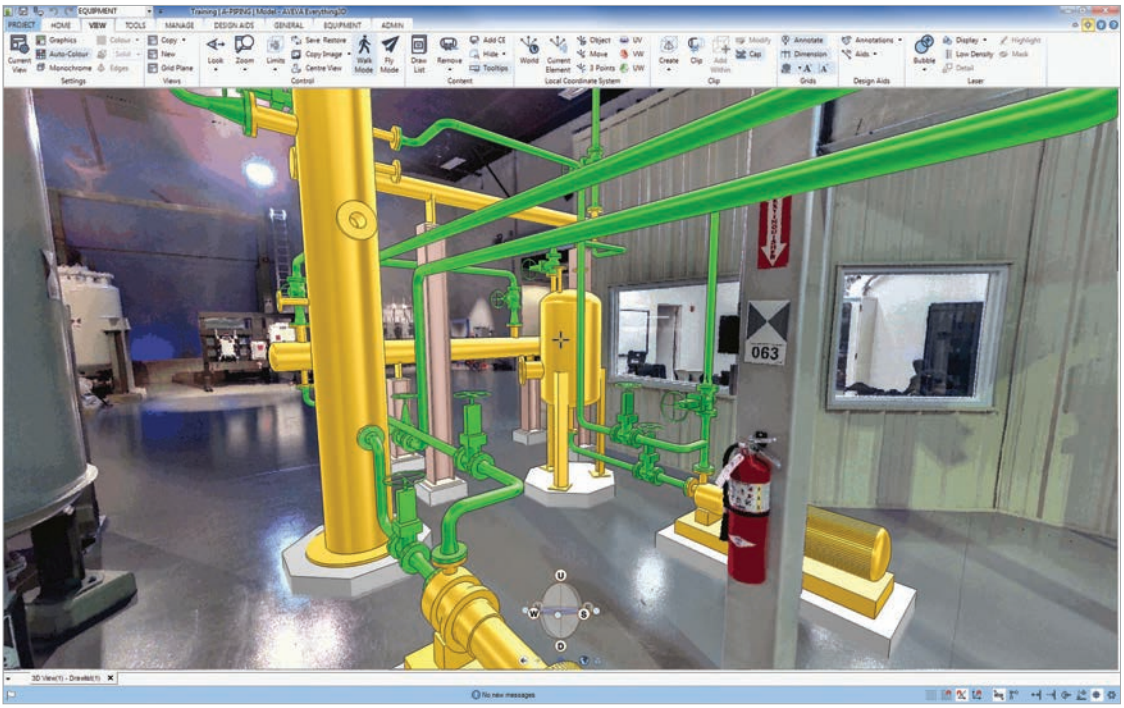
- Set up new projects in hours, not days, with minimal system administration

Design efficiency

- State-of-the-art user interface maximizes designers' productivity
- Automatic, on-demand generation of accurate drawings and reports direct from the 3D model saves time and effort in the design office, eliminates sources of error and ensures that fabrication and construction use validated, up-to-date information
- Accurate and comprehensive change and status reporting enables effective project management and informed decision making
- Integration with engineering tools enables 3D design to be created from P&ID schematics and electrical cables to be imported and routed efficiently in the 3D model
- Photorealistic laser scan data integrated into the design environment enables rapid, intuitive and accurate design of plant modifications, and verification of construction status against the design intent as construction progresses, and verification of construction status against the design intent as construction progresses

Rework-free construction

- Efficient, comprehensive clash detection enables costly on-site rework to be eliminated in the design stage
- Laser scans of as-fabricated and as-built construction can be used to update the design model and enable rapid and effective correction or accommodation of any non-compliant construction
- Drawings, reports and Bills of Materials (BoMs) are produced directly from the 3D project model, ensuring their accuracy
- Rule-based, automatic drawing production ensures that fabrication and construction drawings meet project standards and are based on the most up-to-date design data



AVEVA E3D designers work within an environment that fuses together photo-realistic laser scan data with new 3D design

Business Benefits

Compliance

- Rule-based automation and configurable consistency checking enable higher-quality design in fewer man-hours
- Change highlighting, tracking and status management enable efficient, collaborative compliance with design rules, best practice and contractual requirements

Project execution

- Share configurations, templates, catalogues, design data, rules and customizations between projects
- Build libraries of design assemblies or commonly used modules for reuse on new projects
- Use with AVEVA Global™ for rapid configuration and flexible reconfiguration of multi-location projects
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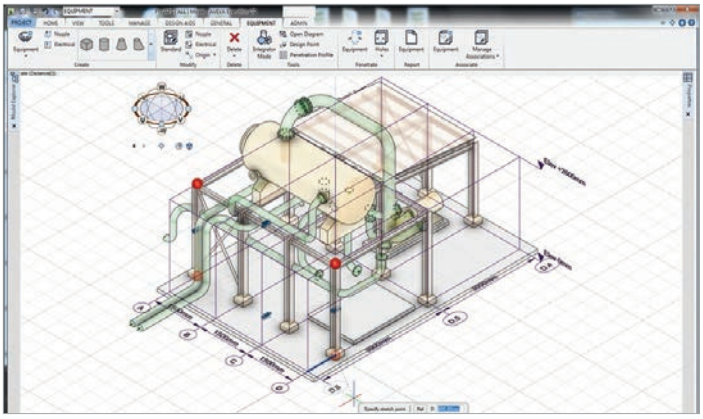
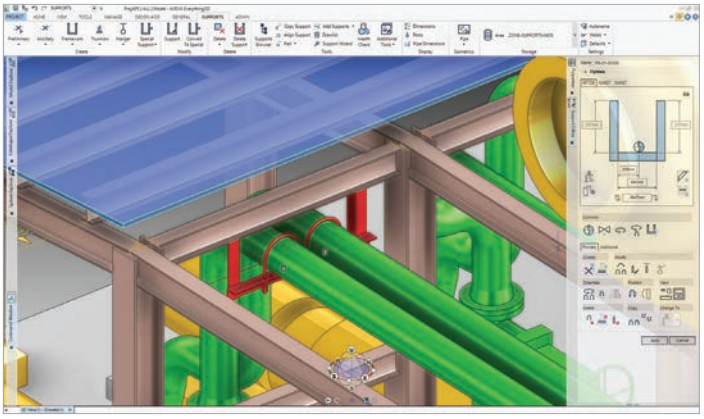
Future-tolerance

- AVEVA E3D Design is a scalable solution with no limit on project size or complexity
- An initial AVEVA E3D Design deployment can be expanded at any time by the addition of self-integrating AVEVA design, engineering and Information Management products and solutions



Grid lines, dimensions and annotations can all be included in the 3D view



Fully detailed supports can be quickly added to the design

Key Features

Easy configuration

AVEVA E3D Design can be quickly configured to suit specific company or project requirements in areas including:

- Data structures
- Access rights
- Design status controls
- Consistency checking rules
- Report and drawing formats

Configurations can be applied at project level, enabling compliance with different clients' requirements on individual concurrent projects. Company or project-specific procedures and workflows can be readily customized and robustly enforced.

A built-in macro language, PML, together with a .NET API, provide almost unlimited flexibility in creating custom functionalities to increase efficiency and build valuable proprietary expertise.

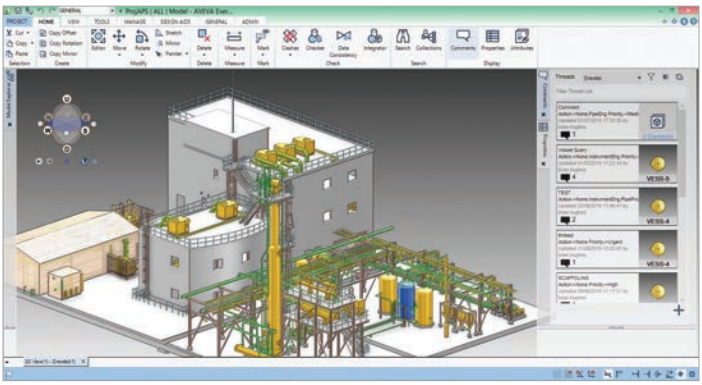
Marine capabilities

AVEVA E3D Design is able to work alongside AVEVA Marine™ on projects, making a fully clashable and drawable hull model available to AVEVA E3D users. Inside AVEVA E3D's DRAW module it is also possible to create Hull Symbolic Views. This means that AVEVA E3D Design is an ideal partner for any marine project.

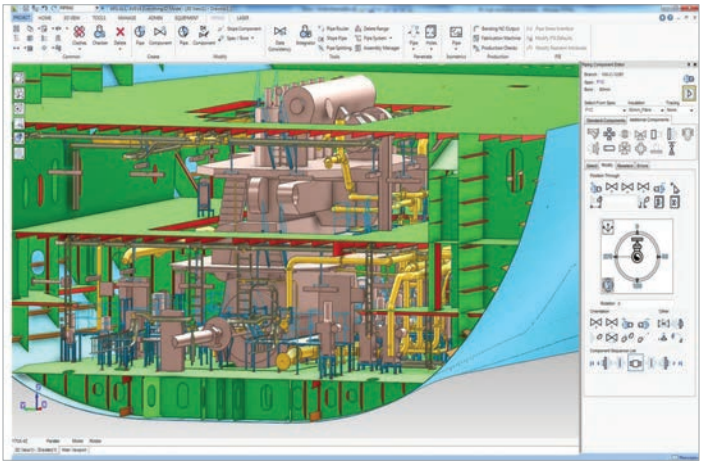
Integration of laser scan data into the design environment

This powerful enabling technology offers dramatic efficiency gains on both greenfield and brownfield projects. When designing modifications to existing assets, new designs can be accurately aligned to tie-in points, and clashes between the new and existing construction eliminated.

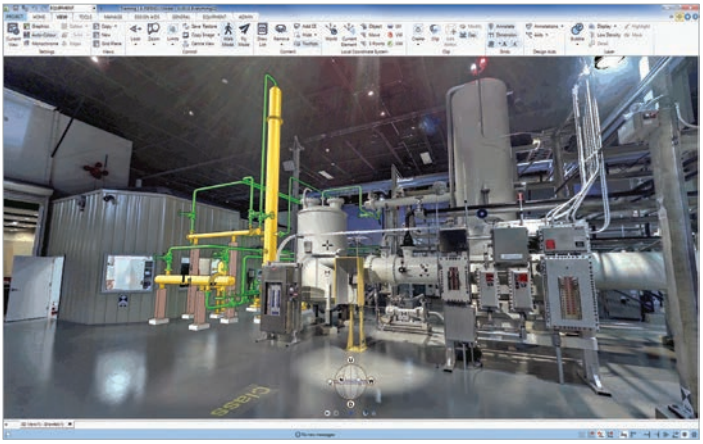
Laser scans of individual fabrications, modules or the current status of the as-built site, can be rapidly imported for verification against the design model. Non-compliances can be resolved to protect the project schedule, and the design model can be progressively updated to accurately reflect the true as-built construction.



Designers can review and respond to comments and other feedback coming from AVEVA E3D Design Mobile users at the construction site



Hull data in the 3D view



Laser scan data integrated into the 3D view

Key Features

This offers significant benefits. To the project, by aligning new design to the as-built at every stage; and to the client, by providing a reliable design model for the asset's life-cycle management.

AVEVA E3D Design users have ability to interact with data from any laser scanner, traditional static scanners and mobile, airborne and hand-held devices from a wide choice of manufacturers including FARO, Leica Geosystems HDS, Riegl, Trimble Dimensions and Z+F. AVEVA E3D Design's laser capabilities are based on LFM technology and it works with pre-processed LFM Server™ datasets.

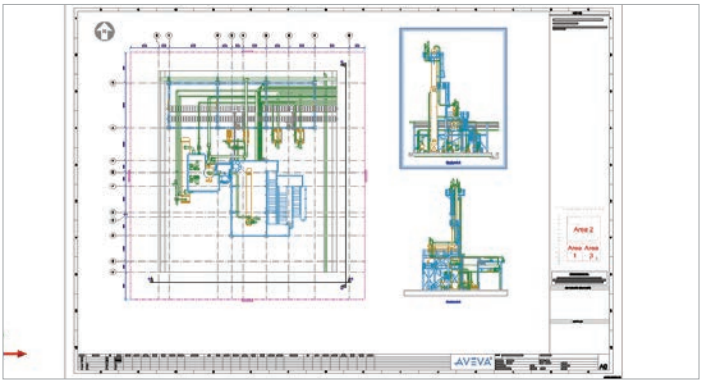
Incorporating new and unique HyperBubble™ technology allows the user to work in a fully immersed as-built environment. AVEVA E3D Design provides the ability to demolish parts of the point cloud data, and when used alongside LFM Server with supporting work-processes the ability to demolish and add updated scans delivers a 'Trusted Living Point Cloud'. Users can treat this as their 3D world for modelling, safe in the knowledge that they have the most up-to-date information possible.

Intuitive user interface

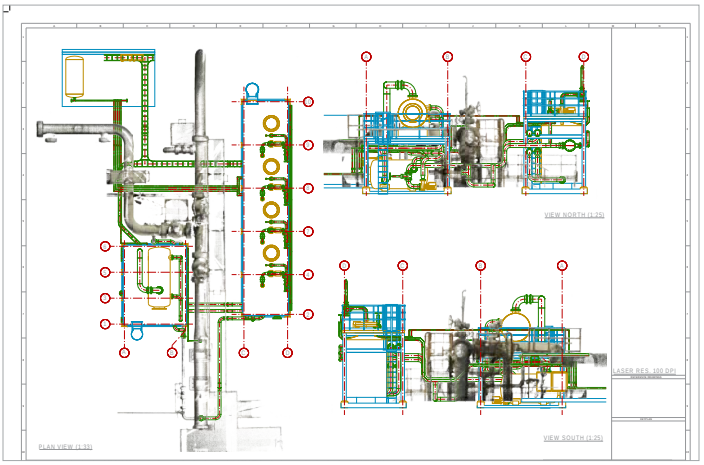
Incorporation of the latest Microsoft® Fluent™ interface technology, gesture interaction and configurable context menus streamlines the process of design, making it easier, more enjoyable and more productive. The unique AVEVA PowerWheel™ command accelerator provides rapid and intuitive access to frequently used functions.

Integration with AVEVA engineering tools

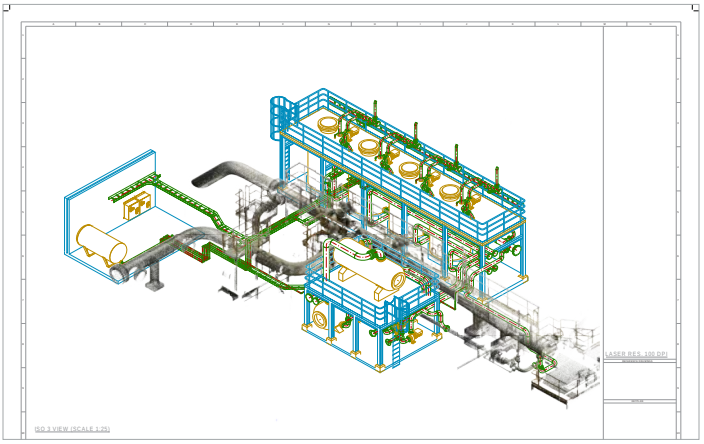
The design process translates engineering information into 3D reality. AVEVA E3D Design enables data from engineering and schematic applications such as AVEVA Engineering™ and AVEVA's P&ID applications to be imported and to automatically create the corresponding 3D objects, ready for positioning in the model. Three-way association between schematic, engineering and 3D data ensures that changes or inconsistencies are reflected in all until accepted or corrected.



Drawings can be automatically generated from the 3D model



Layout and arrangement drawings can include laser data



Laser data in DRAW avoids the need to remodel existing constructions

Key Features

Similarly, integration with AVEVA Electrical and Instrumentation™ enables cable data to be shared with 3D design, facilitating accurate routing of cables according to configurable design rules and returning accurate cable lengths.

Integration with AVEVA E3D Structural Design enables the structural layout created in AVEVA E3D Design to be transferred seamlessly into structural detailing and fabrication and returned into AVEVA E3D Design to update the definitive project model.

AVEVA engineering products such as the above integrate seamlessly with AVEVA E3D Design. Compliance with open and industry standards further enables AVEVA E3D Design to work with data originating in many third-party applications.

Laser data in drawings

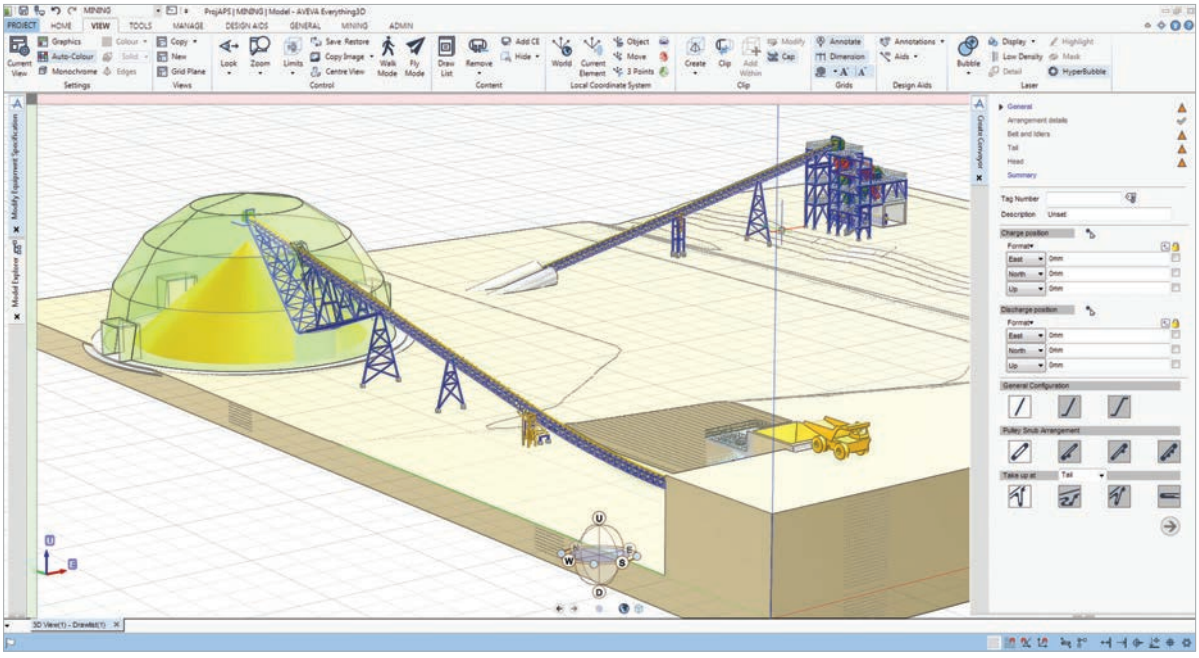
The ability to demolish laser data and keep the point cloud up to date is critical, but when coupled with the ability to add the point cloud to drawings, as you would with any other model element, it provides the user with extremely powerful tools.

Being able to represent up-to-date laser data in drawings means it is now possible to replace the huge number of hours wasted on modeling old plants, often from incomplete or unclear information, with a simple, cost-effective laser scan. This introduces significant project cost savings.

In-context access to the full Digital Asset

Design in Context™ enhances the design process by serving up relevant content from your Digital Asset to your design teams within AVEVA E3D Design, to improve the speed and reliability of their design decisions. The Design in Context capability creates a direct connection to the centralized Digital Asset repository (if available). When an object is selected in AVEVA E3D Design, the Context panel dynamically updates a list of available content relevant to the selection, such as datasheets, vendor documentation, purchase orders, planning charts and calculation sheets.

This content can then be opened, in context to the selected object, via a new embedded universal viewer, ensuring decisions are made in relation to all available information.



AVEVA E3D Design includes different conveyor arrangements design with a friendly and comprehensive interface

Key Features

Optimum use of design automation and rules

AVEVA E3D Design features extensive capabilities for design automation through the configuration of rules. These rules respect engineering boundaries and access rights. They provide the productivity advantages of rule-based design automation while ensuring that design authority for changes remains with the relevant responsible disciplines.

If a non-compliant design feature is created, the system highlights and explains the non-compliance until it is corrected. It permits a designer to create a provisional, non-compliant feature as an interim step in the process of refining a compliant overall design. An additional benefit of this approach is that less experienced designers can rapidly increase their skills by 'learning while doing'.

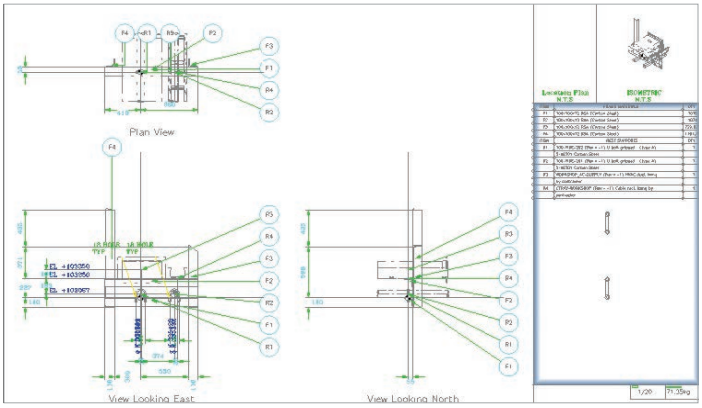
Automatic routing of pipes and cable trays in accordance with preconfigured rules is a popular feature in 3D design solutions, but rarely creates an optimum design by itself. AVEVA E3D Design enables a designer to switch between automatic routing to save time on simple or repetitive work, and intuitive manual adjustment tools to refine the routes for a high-quality overall design.

Similarly, rules can be configured for the creation of stairs, ladders and handrails in accordance with project standards, while designers are provided with tools to quickly and easily incorporate these standards-compliant structures into the overall design.

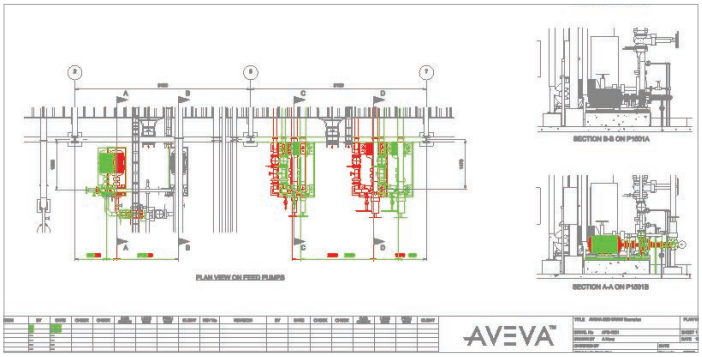
Automatic cable routing

This standard feature enables instrumentation and/or electrical cables to be automatically routed into cable trays in accordance with preconfigured rules defining such parameters as tray fill levels, route selection and signal/power cable separation.

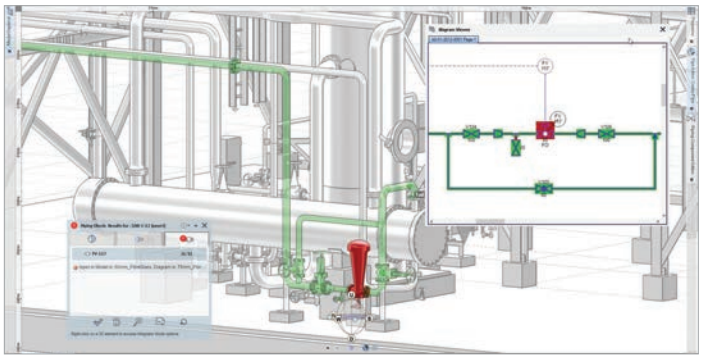
Cable definitions can be obtained from AVEVA Electrical and Instrumentation where used, or imported via Microsoft Excel™ from third-party systems. Accurate cable lengths, including any excess allowances, can be returned in the same ways for the creation of BoMs and drumming.



Automatically-produced pipe support drawing



Automatic change highlighting

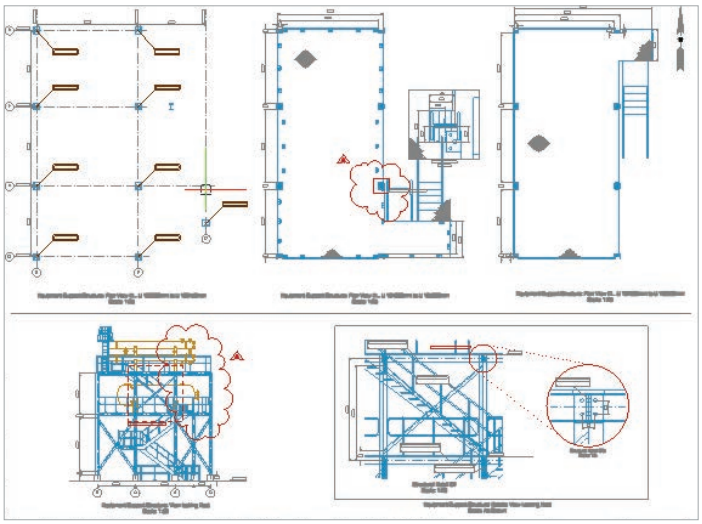


Integrated engineering – compare and update between P&ID and 3D model

Key Features

Unrivalled design reuse

AVEVA E3D Design enables extensive sharing and reuse of data between projects as standard. Engineering standards, catalogues and even reference designs can be shared between projects. This not only saves the cost and time of unnecessary duplication, it eliminates many opportunities for error, maximizes the value of proprietary design expertise and enables more efficient repeat projects.



A structural layout drawing

Efficient management of subcontract work packages

Subcontracting work is common practice, although it requires the ability to manage the interface with the subcontractor and to validate their work before accepting it. AVEVA E3D Design provides a unique Extract functionality that enables a subcontractor to work independently, developing a package of design without impact on the master project model. Following approval of the work, it can be automatically incorporated into the project model.

Change management

Design is an iterative process, involving many continual changes as it progresses from initial concept to its final, fully-detailed state. AVEVA E3D Design provides robust change management functions that enable designers to make and accommodate changes in a controlled manner, to see what has changed, and to automatically create an audit trail of changes as they work.

AVEVA's unique Compare & Update function enables, for example, AVEVA E3D Design piping designers to compare the definition of the line they are working on against the line list and P&ID data. When differences are identified the designers can choose when to implement which changes, enabling them to prioritize and plan an efficient workload, and to ensure data consistency before producing deliverables.

Change highlighting, both in the 3D model and in 2D drawings, is used extensively to communicate and ensure the visibility of changes until they are corrected.

Key Features

Design quality assurance

Intelligent clash detection and highlighting, both between individual design objects and between design objects and laser scans of an as-built structure, helps designers avoid clashes as they work. Clashes are classified for reporting and management purposes as ‘hard’, where objects physically occupy overlapping space; ‘soft’, where objects’ exclusion volumes for accessibility overlap, or as intermediate conditions. All clashes are reported for project management purposes until eliminated.

Inbuilt status control enables designers to clearly specify the status of their own work and to easily understand the maturity of data from other disciplines that they work with.

Consistency checking between the 3D model and the P&ID highlights inconsistencies in the data and enables selective electronic updating.

Sophisticated data management and access controls ensure that each designer has the correct level of access to relevant project information.

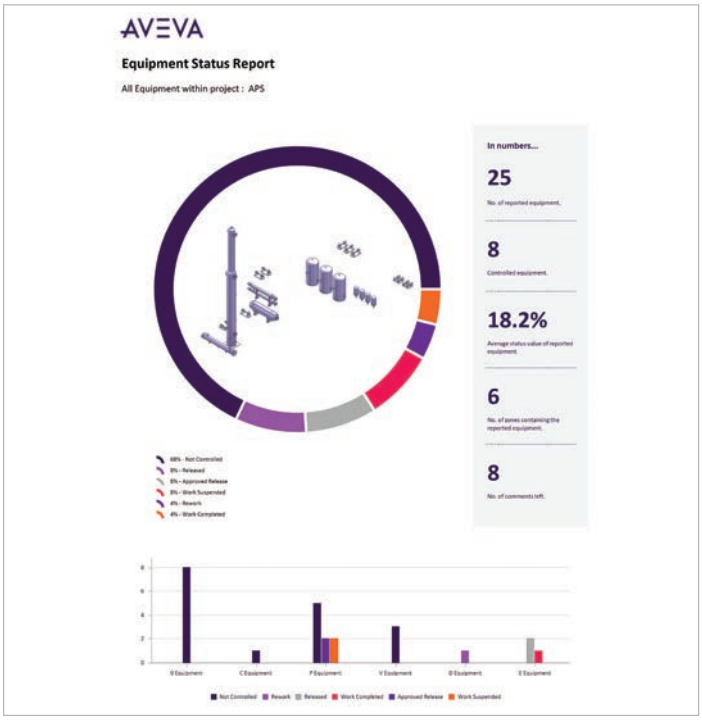
Configurable design rule checking enables users to extend or modify the default rules provided in the standard AVEVA E3D Design deployment, to meet company or client-specific standards.

Configurable automation of deliverables

Many drafting tasks are repetitive. Configurable automation tools enable annotated and dimensioned drawings to be automatically generated. For the many types of detail drawings produced in large quantities this can typically save thousands of man-hours on a project.

All deliverables – drawings, piping isometrics, BoMs or reports – are generated directly from the definitive 3D design model, ensuring their accuracy and completeness. Templates and rules ensure that drawings and reports automatically comply with project standards.

AVEVA E3D Design’s DRAW module also includes advanced 2D drafting tools that interact with the design model, enabling customers to quickly and easily add notes, annotation, sketches and dimensions without any need for a separate 2D drafting system.



AVEVA

Equipment Status Report

All Equipment within project : APS

Equipment Tag	Design Status Comment	Design Status	Status %
03SKID1-PUMPA	---	Not Controlled	0.0
03SKID1-PUMPB	---	Not Controlled	0.0
03SKID2-PUMPA	---	Not Controlled	0.0
03SKID2-PUMPB	---	Not Controlled	0.0
03SKID3-EQUIP1	---	Not Controlled	0.0
03SKID3-EQUIP2	---	Not Controlled	0.0
03SKID4-EQUIP1	---	Not Controlled	0.0
03SKID4-EQUIP2	---	Not Controlled	0.0
C1101	---	Not Controlled	0.0
D1201	Re-work Required	Rework	25.0
E1301	Phase 1 finished	Released	100.0
E1302A	Kick off meeting	Work Completed	40.0
E1302B	Kick off meeting	Released	100.0
P1501A	Release approved	Approved Release	80.0
P1501B	Release approved	Approved Release	80.0
P1502A	Requirement change	Work Suspended	15.0
P1502B	Requirement change	Work Suspended	15.0
PMP-10	---	Not Controlled	0.0
PMP-11	---	Not Controlled	0.0
PMP-7	---	Not Controlled	0.0
PMP-8	---	Not Controlled	0.0
PMP-9	---	Not Controlled	0.0
VESS-3	---	Not Controlled	0.0
VESS-4	---	Not Controlled	0.0
VESS-5	---	Not Controlled	0.0

Above and above, right: Examples of reports showing the design status of equipment in a project

Key Features

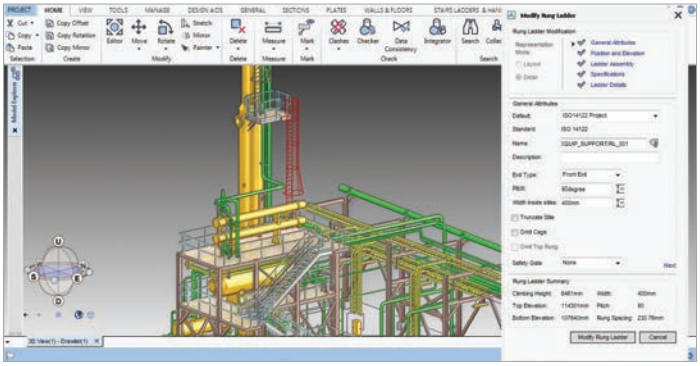
Object-centric data management

Unlike file-based design systems, AVEVA's are database-driven. As designers work, they are creating an object-centric description of the entire project. Each object, such as a valve, pump or pipe, has associated with it an extensive quantity of attribute and association data.

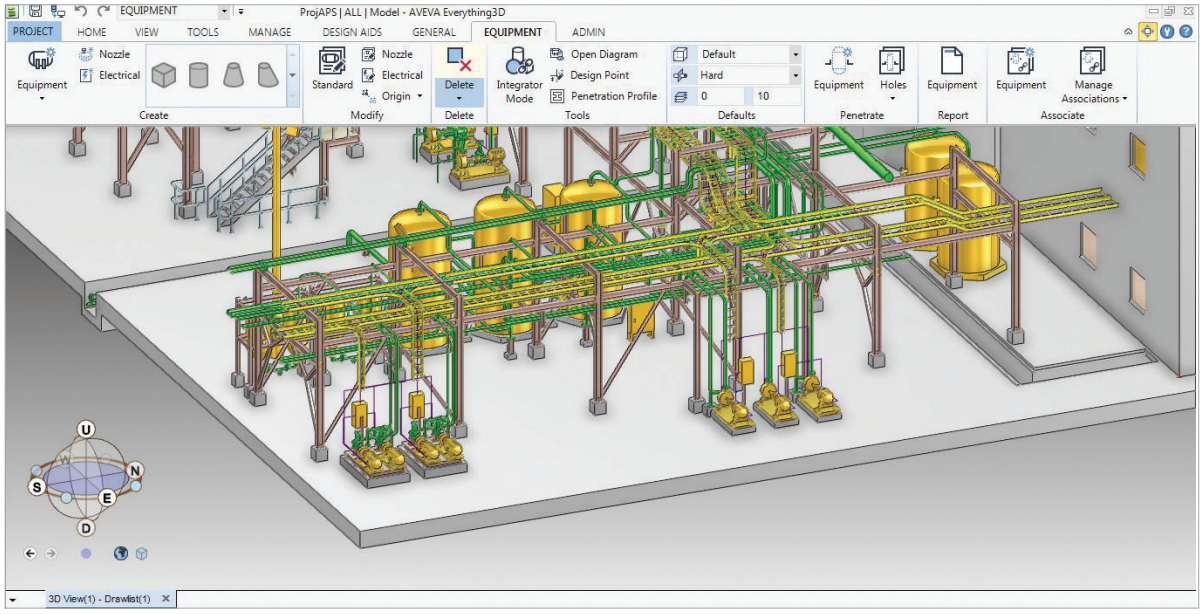
The project database created represents a digital asset of almost incalculable value. It not only supports the access rights, change control, status management, workflows and so on required for efficient project execution, but can also be shared with ERM, ERP and MIS systems for efficient business management, and can be used to populate a client's Information Management system for asset life cycle management. AVEVA E3D Design ultimately creates value both for its direct users and for their clients, creating significant competitive advantage.

Project and discipline management tools

Configurable status reporting can be used not only by designers in their day-to-day work, but also by project and departmental managers for monitoring progress and forecasting workloads, and by discipline managers to enforce adherence to workflows and change control.



The Stairs, Ladders & Handrails application, showing stair design (above) and ladder design (below)



User-adjustable edge definition, shadows, transparency and highlights make it easier to understand complex 3D models

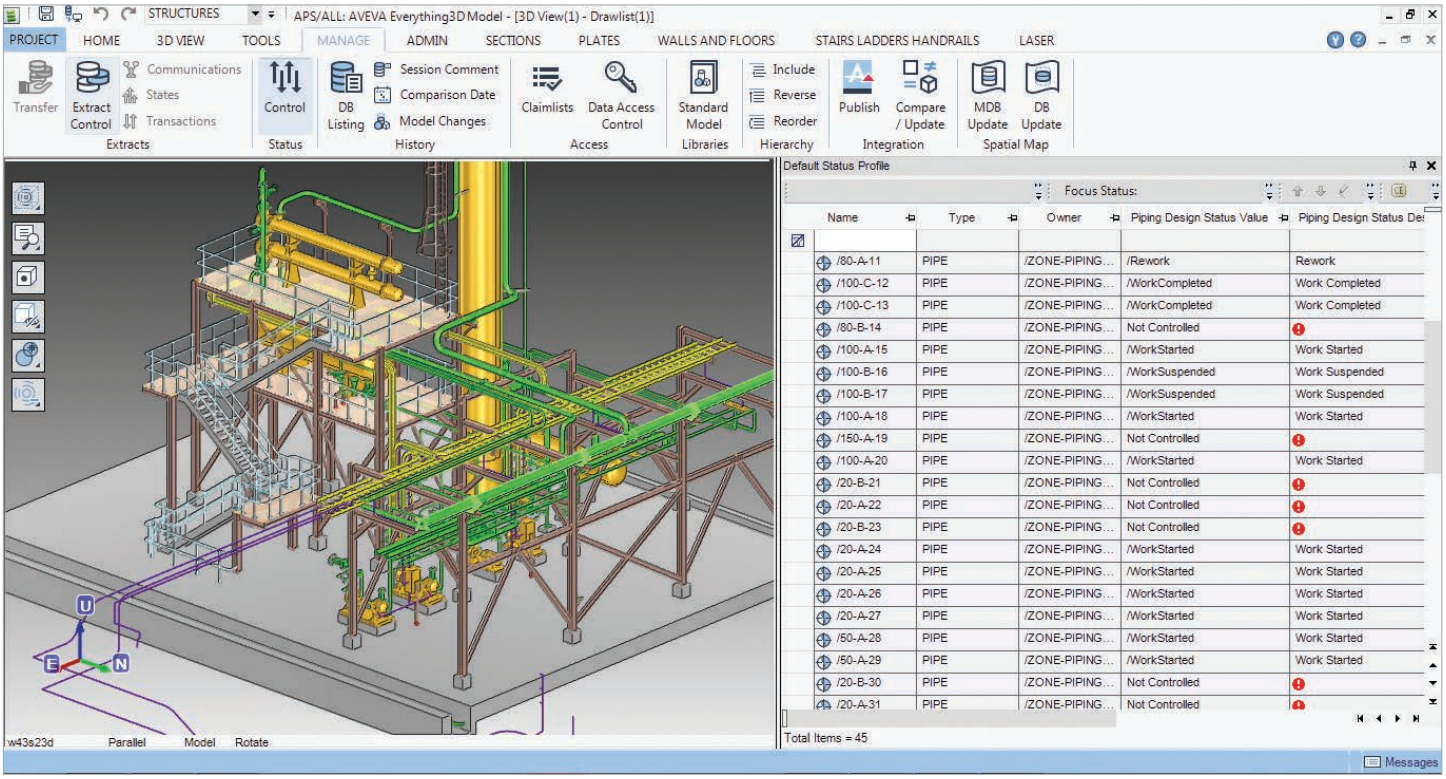
Additional Products

For new adopters of AVEVA E3D Design, with no existing AVEVA infrastructure, the following additional products are included to provide immediate and full value from the technology:

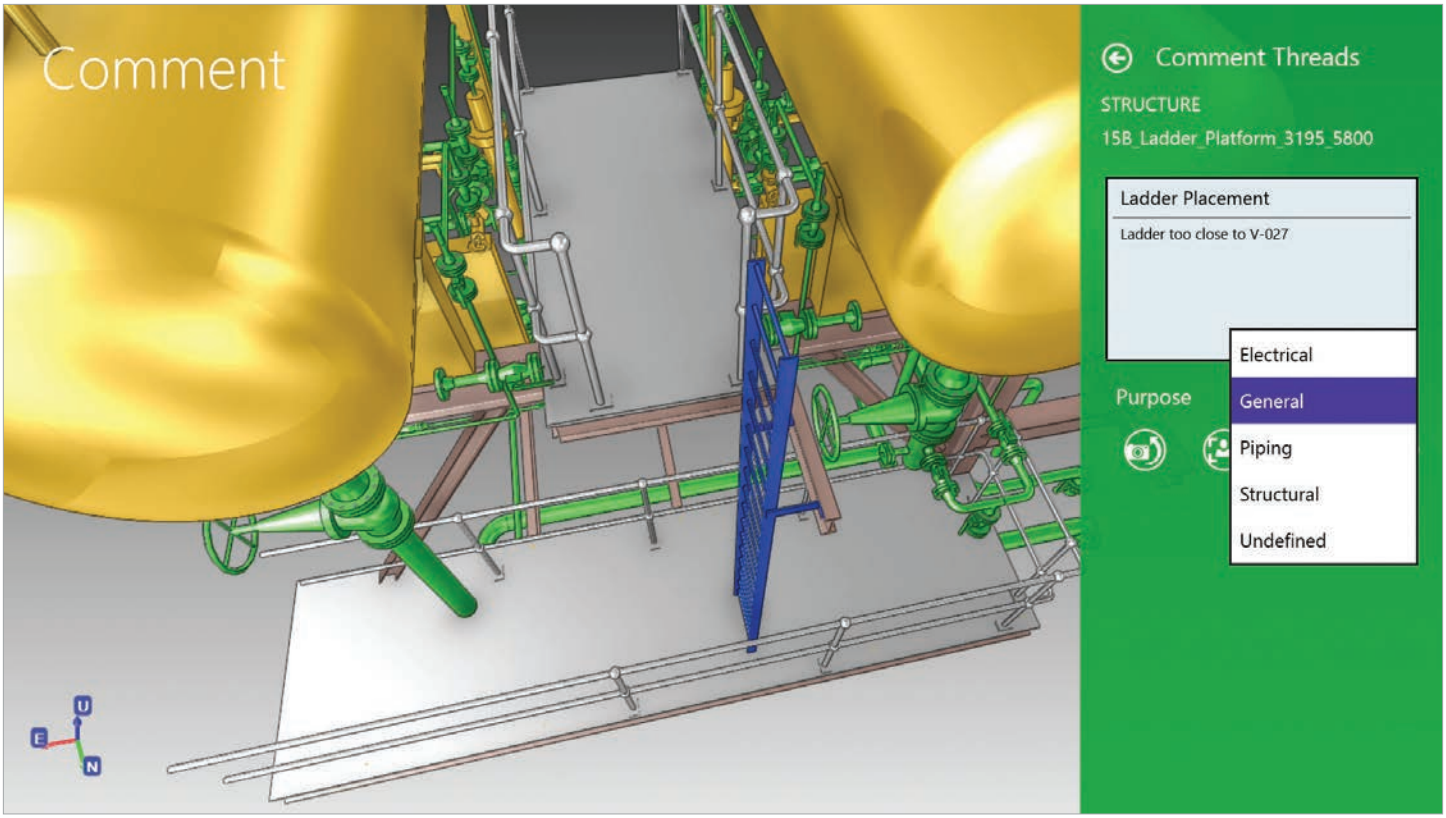
- AVEVA Administration™ for system administration and configuration
- AVEVA Catalogue™ for the definition of engineering specifications and component catalogues.

The following optional products are particularly recommended to extend capabilities and efficiency:

- AVEVA E3D Structural Design™ for supporting detailed design for all types of steel structures
- AVEVA Global™ for the management of distributed, multi-location working
- AVEVA E3D Design Mobile for anytime, anywhere review and approval of a live AVEVA E3D Design.



Status information is managed in the 3D model and can be queried and included in reports



AVEVA E3D Design Mobile for anytime, anywhere review and approval of a live AVEVA E3D design

Training

To support our customers AVEVA offers classroom training to gain further knowledge in AVEVA E3D Design. Alternatively, if you would prefer a more flexible approach, we do also offer self-training online in our secure AVEVA Cloud environment. To find out more or register your interest please visit the training pages on our website: aveva.com/product-training