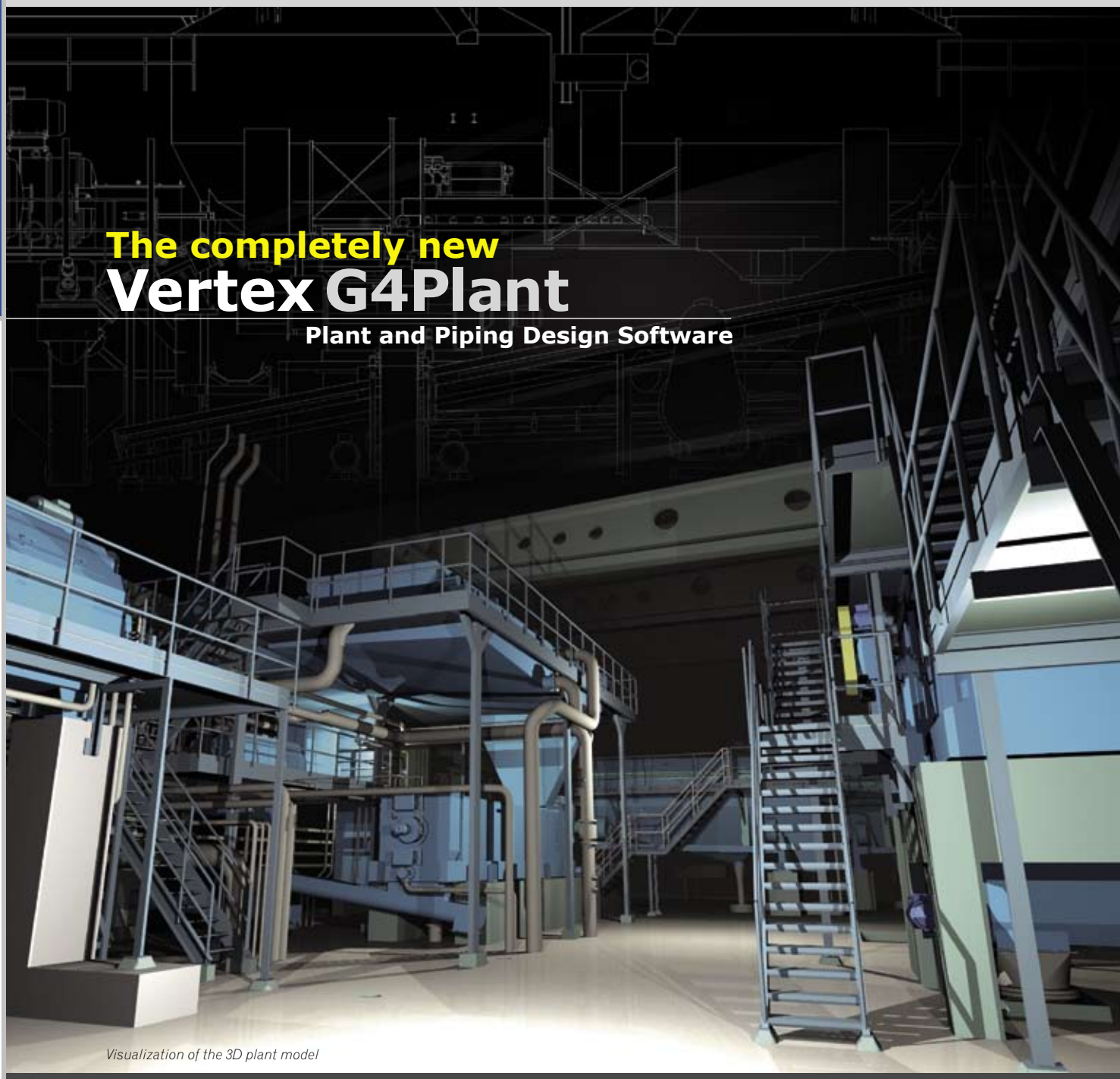


The completely new
Vertex G4Plant
Plant and Piping Design Software

Visualization of the 3D plant model

Next generation 3D design software

Vertex G4Plant is a parametric, feature-based design software suite. It belongs in the Vertex G4 Mechanical Engineering design software family, which has succeeded brilliantly in the market for several years. At its foundation lies geometry management based on the G4 structure with the help of features, constraints between parts or assemblies and the constraint solver.

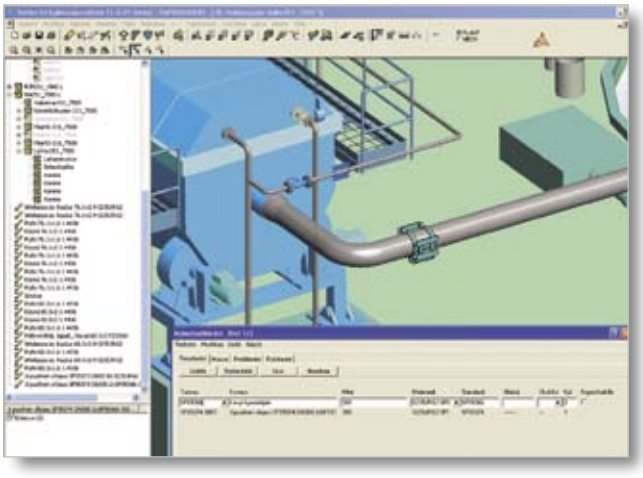
VERTEX SYSTEMS

The 3D design of the building and process equipment is sketch-based. The sketch-based model design on the new G4 software platform is highly practical.

Powerful special functions have been developed for modeling different plant subsections. Combined with the features of the G4 software platform, these special functions increase the flexibility and speed of plant design. The software features and connections to other systems offer greater compatibility throughout the design process.

Designing, managing and editing 3D assemblies and layouts is effortless. The manageability of plant project work phases has been taken to a new level thanks to new technology.

The documents generated from the 3D models meet the needs of extensive plant projects. The drawings and their visualizations, sections and detail magnifications are genuinely associative. Isometric projections and illustrated profile cutting lists can be automatically generated from the 3D model. The models' bills of materials can be listed in the desired format, directly in Excel or a text file. Sheet bending and flattening images, exploded drawings, mass calculation and kinematics viewing are all included in the basic features.



Modeling is also very illustrative, thanks to a feature tree displaying the model structure and work stages.

Features available as options include the Lightworks visualization package for photorealistic images, animation tools and an interface for the FEM analysis of volumes. The Vertex G4Plant workgroup software is a solution for parallel design in different locations and expanded product data management.

Parts and Assemblies

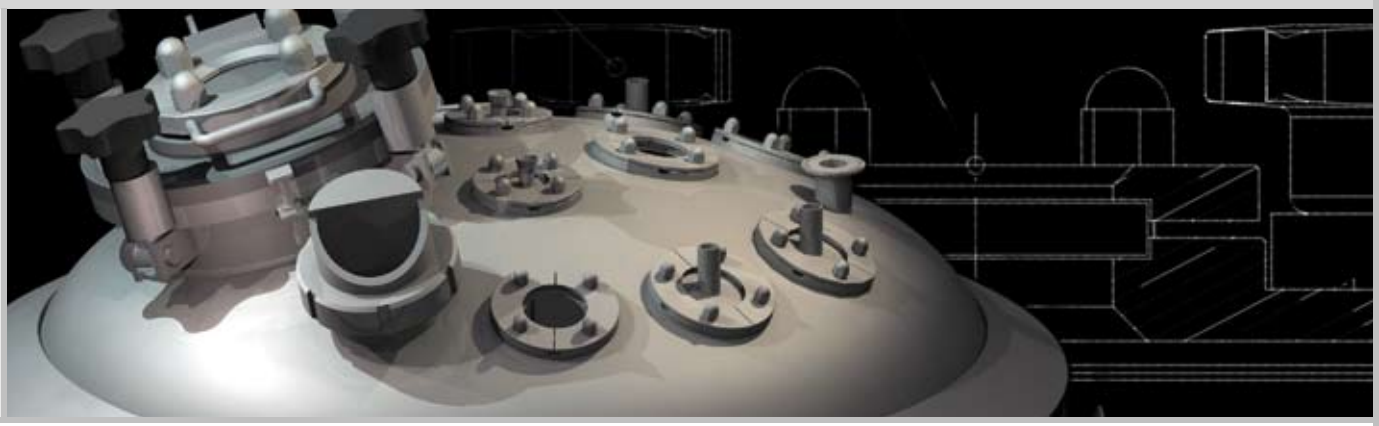
The main types of models created with the Vertex G4Plant software are part and assembly models. An assembly model comprises individual parts, between which you can define geometric constraints. Parts can be individual parts or subassemblies. They can be imported into an assembly either as links or local parts. Individual parts can be intelligent and are controlled with dimension table parameters. Part dimensions can also be entered freely, deviating from the dimension table.

Part Modeling, Sketches and Features

Part modeling is based on user-created sketches or ready-made library sketches. A sketch is typically a cross section which you wish to extrude, rotate or use later as a mere cross section. A sketch can also cut out material from an existing volume or can be defined as a guide curve to be used later in the assembly for various purposes. When a sketch is used for the above-mentioned purposes, they are referred to as editing features. For example, when a sketch is extruded, a boss extrusion feature is created. Volumes are created through bossing, while cutting out is used to delete material from an existing volume using a sketch. When a part is edited, features such as rounding, bevel, shelling etc. are created.

Constraint Solver

The dependencies between parts and assemblies can be defined using geometric constraints. With the help of constraints, parts are connected to each other according to the specified conditions, allowing you to move the parts with the mouse within the limits allowed by the specified conditions. Modeling is highly illustrative, thanks to a feature tree displaying the model structure and work stages.



Modeling Structures and Process Equipment

A comprehensive library of parametric components and features is included in the software delivery. You can save your self-modeled dimension-controlled equipment models in the library, for later use. The software also supports the use of model libraries available directly from equipment manufacturers in various file formats. The profile library includes ready-made steel profiles for buildings, steel frameworks, supports etc.

You can also create a design automation system of the object of your design. You will then only need to enter certain main dimensions, and the system will generate a finished model. The user interface for data entry can be implemented with an Excel worksheet or some other external user inteface, which can generate a control file for the design automation system. In the final phase, Vertex G4Plant is launched and creates the model or assembly according to the specified dimensions.

Special Plant Design Functions

Piping Design and Isometrics
Begin modeling a pipeline by selecting the pipe dimensions. You can change the current pipe properties from the toolbar. As a default, pipe dimension selection is controlled with pipe classes, but if you wish, you can disable them and select parts regardless of pipe classes.

The intelligent pipe component libraries include ready-made, dimension-controlled basic components. Users can easily save models they have designed themselves or received from the component suppliers in the library.

The finished pipeline includes all design data required for the generation of parts lists and drawings. The isometric drawings of the pipelines are generated, including dimensions and parts lists. Versatile tools are available for editing the parameters which control the appearance of isometric drawings and for the creation of the isometric drawings themselves.

Supports
The software includes separate functions for modeling primary and secondary supports. The support libraries contain an extensive selection of ready-made type supports and basic-secondary support types. For Lisega support design, as a standard feature the software includes a connection to Lisega's own support design software. Lisega supports can be directly imported as Vertex support models with a control file generated by Lisega.

Insulation
Insulation can be added to finished pipelines, either by entering the values by hand or using ready-made insulation tables. This allows the insulation's space requirement to be taken into consideration in the plant layout, and the insulation volumes and weights can be exported as lists.

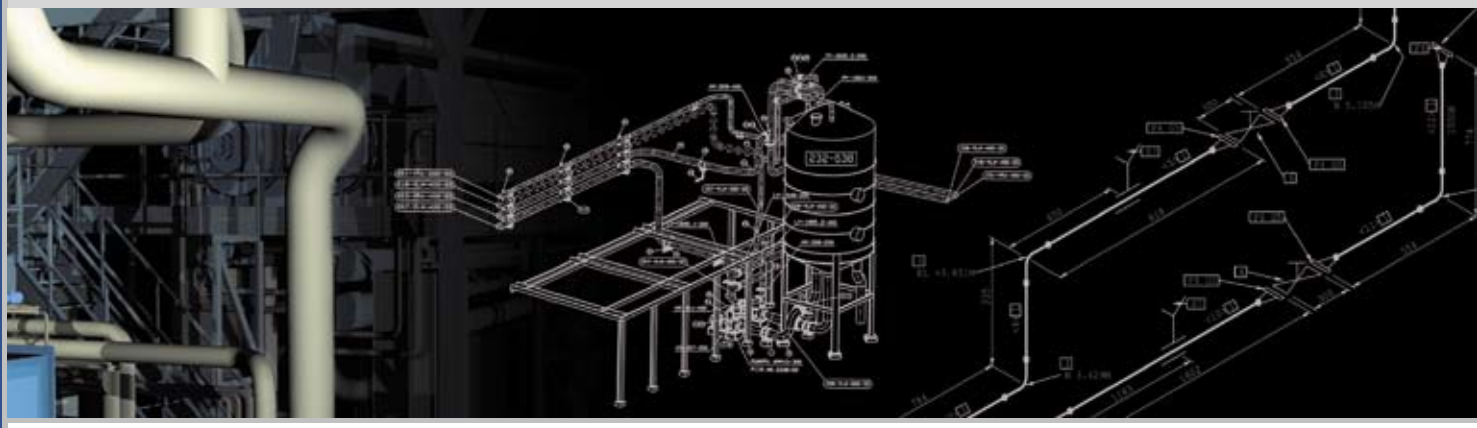
Profile Structure Design
The software includes separate functions for adding profiles and trimming their ends. A comprehensive profile library is included, which the users can complement if necessary by saving their own cross sections within it. In addition to basic listings, an illustrated cutting list of the profiles can be created with a single command, including the cutting angles and shapes of the profile ends in addition to basic information.

Process Instrumentation Diagram Connection
Pipeline data can be retrieved from the intelligent Vertex PI diagram. The software retrieves the data directly from the values specified for the diagram connectors, including the dimensions and line IDs. The data of the apparatus and plant process equipment added to the pipeline can also be retrieved from the PI diagram. If the data and type of a component added to the PI diagram are defined, the software will add a valve of the right type and size to the model, in accordance with the diagram data.

The software includes tools for comparing the model and the diagram. These functions allow you to ensure that the contents of the model and the PI diagram match each.

Cable Shelves
Cable shelves and ladders are modeled parametrically with a separate function, using dimensions provided by the manufacturer. The library includes basic components such as horizontal and vertical shelves, T-junctions, elbows etc. You can create work drawings, listings and isometric drawings of the cable shelves.

Collision Detection
You can perform model collision detection at the desired assembly level. The software finds the detected collisions, which can



then be browsed in a separate user interface. You can also limit the search to apply to piping elements only, if you only wish to study the collisions between the pipelines.

When creating an assembly, you can enable dynamic collision detection. The software will then not allow users to move parts into positions in which they would overlap with each other.

Customizability

The software uses a traditional Windows user interface, including, for example, the Windows keyboard commands Ctrl-C, Ctrl-V, Ctrl-X and Ctrl-Z. The basic properties and parameters of elements can be changed from the toolbar. Elements can be copied directly from one window to another via the clipboard. You can utilize the features of the feature tree when editing a model. You can use the feature tree to carry out basic operations such as hiding, deletion, finding for editing, modifying the properties and editing item data on parts or part patterns in a model. You can create different representations of a model via the feature tree, allowing you to study different structural options, for example with regard to the placing or number of components.

You can move parts and subassemblies in the model with the mouse, within the limits allowed by the specified constraints.

The structures are dimension-controlled, and dimensions can be modified directly through the part's dimension table. For example, you can change the length of a piping component in the pipe model without having to modify the pipeline itself or re-add the component. You can replace a part or an assembly with another, with a single command.

Compatibility with Other Systems

The Vertex G4Plant software supports the saving of models and drawings in several different formats. 3D formats include SAT, 3DS, VRML, STL, STEP, IGES, and CATIA. The last three of these are either optional or additional options. 2D and other formats include HTML, PDF, DXF, DWG, JPG, and TIFF.

Documents Generated of the Models

Dimensioned, associative work drawings and section visualizations are generated from part and assembly models. No separate software is required in the editing of visualizations; all drawing tools needed to create detail drawings and other additional details are included in the software. The Vertex G4Plant software includes all the tools required in the creation of 2D drawings.

Isometric pipe drawings can be generated of the selected pipelines or the selected pipeline sections. The 2D tools included in the standard software delivery are also used in the handling of isometric drawings.

Other generated documents include illustrated profile cutting lists and sheet metal design flattenings. The standard software delivery supports the generation of PDF files of drawings and 3D views. Mass center and mass calculations can be generated of the desired parts ñ or the entire plant model, if you so desire.

Parts lists are output in text or Excel format. You can limit the contents of the parts lists based on what model data you wish to list, for example just the piping components, insulation, supports etc. You can also modify the format of the parts list as required.

Additional Options

Visualization (Lightworks), FEM analysis, Vertex Workgroup Software, Vertex PDM.

Vertex Workgroup Software

You can divide work between different offices with the help of the Vertex workgroup software. Project participants have all project-related Vertex documents available in real time. Model and drawings archives as well as items and product structures are shared between the workgroup. In addition, the component, feature, profile and symbol libraries are available to everyone.

The workgroup software manages the users and file access rights. According to their tasks, users can have either design or viewing rights to the project documents. A viewer license also enables access to the design data via a browser user interface.

Connections to ERP systems, office-specific file servers and PDF conversion service for drawings are available as additional options in the workgroup software.

The Vertex workgroup software can be expanded into the Vertex PDM software, which, for example, enables support for documents created with other software.

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