ESAPRO Plant Design

Plant Solutions

The ESAPRO modules dedicated to piping designers

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MAKE YOUR PLANT DESIGN EASY

ESAPRO Plant Design

Plant Design is a family of applications dedicated to the 3D design of industrial plants. With these applications, you can **model piping**, create **isometric sketches**, design **supports**, and verify **pressure loss**.

ESAPRO 3D PIPING

ESAPRO 3D Piping is ideal for designing 3D plants. It offers customizable **catalogs** with **over 100,000** components, real-time **interference checking**, modeling of **equipment** and **steel structures**, **2D drawings** and **BOMs**. It is also integrated with ESAPRO P&ID.

ESAPRO ISOMETRICS

ESAPRO Isometrics is the ideal software for creating **automatic isometric sketches** and generating **material lists**. Integrated with ESAPRO 3D Piping, it offers powerful **dimensioning** and automatic **annotation features**, ensuring speed, graphical quality, and flexibility.

ESAPRO SPOOL

ESAPRO Spool is an add-on to the ESAPRO Isometrics module that allows for efficient organization of **spool prefabrication** for the workshop. It **automatically** identifies and **labels spools**, generates **material lists**, and creates detailed **sub-sketches** with **dimensions**.

ESAPRO SUPPORTS

ESAPRO Supports is an add-on to ESAPRO 3D Piping for designing 3D piping supports. With an extensive **library of parametric parts**, it automatically generates **2D construction drawings** with **dimensions** and **material lists**, improving project efficiency.

ESAPRO STRESS INTERFACE

ESAPRO Stress Interface is an add-on to ESAPRO 3D Piping that **exports 3D geometry** to the most popular piping stress analysis software like **CAESAR II®**, **PASS/SUITE®**, **ROHR2®**, and **AutoPIPE®**. By generating neutral PCF files, it eliminates the need for manual input.

ESAPRO HEAD LOSS

ESAPRO Head Loss is an add-on for the ESAPRO 3D Piping module that **calculates the head loss** in pipelines. It generates a spreadsheet from the 3D model, showing **losses for each component** and the **total**, validating your plant.

ESAPRO 3D PIPING

The main features

Product Description:

ESAPRO 3D Piping is a comprehensive software for creating 3D plant layouts. Using standard AutoCAD solids, it offers high execution speed and accurate graphical representation, both during modeling and in the printing of views and sections. Designed to facilitate work to the maximum, it reduces the difficulties of 3D modeling even for less experienced users.

Main Features:

1. Piping Class-Driven Design: ESAPRO 3D Piping allows constant control of piping classes, speeding up plant design and ensuring the accuracy and precision of the components used. The "Specification Management" module allows easy creation of custom piping classes, choosing from all available components in the dimensional catalog. Defined classes can be modified at any stage of the project, with automatic updates of already modeled lines.

2. Maximum Speed and Precision in 3D Modeling: ESAPRO 3D Piping makes 3D plant modeling extremely fast and precise. It offers powerful tools for automatic line routing, automatic line dressing with pipes and fittings compliant with the piping class, and accurate component placement on the line using snapping functions and reference points of the piping or pre-existing components. It is possible to edit the characteristics and geometry of the line with automatic adjustment of all present components.

3. Customizable Dimensional Catalog: The software provides hundreds of parametric graphical functions that generate the 3D model of piping components by drawing dimensional data from the centralized database. With over 100,000 piping components organized into 1,500 dimensional tables, ESAPRO 3D Piping offers a wide library compliant with international standards (ASME, ISO/DIN/UNI, BS, BPE, etc.). It includes libraries of PVC, PTFE, fiberglass, sanitary, and Victaulic components. Components can be customized or imported directly from suppliers.

4. Structural Steel Modeling: The base product includes a module for quick creation of auxiliary steel structures for piping. With fast and intuitive interfaces, it is possible to create beams from a customizable database and adapt them to specific needs through shaping and editing commands. Commands are available for the automatic creation of racks, columns, squares, base plates, railings, gratings, staircases, ladders, and spiral staircases. The program provides the BOM of various profiles and the total weight of the structure.

5. Equipment Modeling and Import: In addition to a parametric library of pumps, tanks, heat exchangers, and other devices, ESAPRO 3D Piping can import solids modeled with AutoCAD/BricsCAD or external files in standard formats (ACIS, STEP, SAT, etc.), converting them into ESAPRO equipment with recognized connection points as nozzles.

6. Standard Supports Modeling: The included libraries contain more than 70 standard parametric supports. Once inserted, they can be counted and automatically transferred to the isometric sketches and interchange files for stress analysis.

7. Real-Time Interference Checking: The module detects any interferences during modeling, including other piping lines, steel structures, equipment, supports, and cable trays. A manual command is also available for on-demand checking of the whole plant.

8 Integration with ESAPRO P&ID: Specific functions constantly verify the consistency between the P&ID and the 3D model, ensuring perfect integration.

9. Drawings Creation: The automatic drawing function generates plans, views, sections, and isometrics with great versatility and detail. Changes to the 3D model are automatically reflected in the drawings, which can be exported as simple 2D DWG files.

10. Automatic Isometric Sketch Extraction: Isometric sketches, complete with dimensions, tags, references to other sheets, welds, insulations, cut lists, and material lists, are automatically created through ESAPRO Isometrics. The 3D Piping environment allows for easy, fast, and fully controllable sketch generation.

11. Rendering and Animation: ESAPRO 3D Piping supports shaded modeling and photorealistic rendering for high-impact presentations, including animation and film creation.

12. Maximum Compatibility with External Software: All produced files are simple DWG files with standard AutoCAD entities, facilitating file interchange with other software.

ESAPRO 3D Piping is the ideal choice for precise, fast, and integrated 3D plant design, optimizing workflow and improving operational efficiency.

ESAPRO ISOMETRICS

The main features

Product Description:

Adding ESAPRO Isometrics to your workflow allows you to create automatic isometric sketches and generate detailed material lists quickly and accurately. This module drastically reduces drawing development time, maintaining high graphical quality and multiple editing possibilities.

Main Features:

1. Automatic Sketches from 3D Piping Model: ESAPRO Isometrics automatically generates sketches from the (.ISO) files created with ESAPRO 3D Piping. With high automation and superior graphical quality, it sets new standards for isometric sketch generation. During sketch generation, you can choose various options, such as creating out-of-scale sketches or keeping original proportions, plant north orientation, and customizable automatic dimensioning.

The software also automatically inserts elevation tags, component tags, and graphical representations of components continuing on other sheets, with relevant references. It includes tables for materials, pipe cutting and marking, welds, insulation, and line pressure and temperature data, with automatic title block completion from Excel sheets.

2. Rich Graphical Tool Environment: ESAPRO Isometrics offers a rich graphical environment for refining and optimizing the appearance of automatic sketches. You can easily edit the position and orientation of dimensions, the position of tags, and integrate the sketch with additional dimensions or tags. You can also define spool limits, mark on-site welds, and add manual notes necessary for construction, without having to return to piping.

3. Automatic Generation of Material Lists: Once the drawing and dimensioning of the isometric sketch are completed, ESAPRO Isometrics can automatically generate material lists. These lists can be customized, printed directly, or exported in TXT or Excel format for further processing or integration with external software.

4. Direct Sketch Drawing (Manual Mode): ESAPRO Isometrics also allows you to draw sketches manually from scratch, without necessarily creating the piping in 3D. This mode is particularly useful for making small changes to existing plants or drawing isometric sketches complete with dimensions and material lists from a 2D piping plan. The environment controlled by piping classes and supported by an isometric symbol library makes the process easy and accurate, allowing you to obtain the actual pipe lengths and the resulting material list.

5. Piping Class-Driven Environment: ESAPRO Isometrics speeds up plant design by constantly controlling piping classes, ensuring accurate control of used components. The "Specification Management" module allows easy assembly of piping classes by choosing components from the dimensional catalog. Defined classes in the database can be modified at any stage of the project, with automatic updates of already drawn lines.

6. Customizable Dimensional Catalog: The software features hundreds of isometric symbols representing piping components by drawing dimensional data from the centralized database. With over 100,000 piping components organized into 1,500 dimensional tables, ESAPRO Isometrics offers a vast library compliant with international standards (ASME, DIN, ISO, UNI, BS, BPE, etc.). Each part has descriptions in multiple languages and the ability to have its part number. Symbols can be customized by drawing new symbols directly in AutoCAD and inserting them into the library.

7. Customizable Graphical Environment: The whole graphical environment of ESAPRO Isometrics can be easily customized by the user. You can define your standard for graphical symbols, sheet formats and related title blocks, colors and thicknesses for lines and components, dimensioning styles, text styles, and graphical styles for list tables.

8. Customizable Material, Cutting, and Weld Lists: ESAPRO Isometrics automatically generates several types of tables within the drawing or exports summary lists of the entire project in TXT or Excel format. It can produce prefabrication and construction material lists with weights and painting surfaces, pipe cutting lists including possible extra lengths and weld shrinkages, weld lists with relevant tags, diameter, material, and weld type, PED tables summarizing process data, and insulation lists with linear meters and insulated surface needs.

9. Multi-user Database Integrated with the P&ID Environment: The project database, based on the standard Microsoft SQL Server engine, is shared by all P&ID drawings, 3D Piping models, isometric sketches, and the electrical design environment. The "Publication" command allows you to transfer the data in the drawing to the database, making it available to the entire project team.

ESAPRO Isometrics is the ideal solution for optimizing the creation of isometric sketches and generating material lists, improving the overall project's efficiency and accuracy.

ESAPRO SPOOL

The main features

Product Description:

ESAPRO Spool is an add-on to the ESAPRO Isometrics module that enables efficient organization of spool prefabrication for the workshop. This module allows for dividing a sketch into spools and automatically generating a material list for each, improving the management of piping line prefabrication and providing precise and detailed information on the required materials.

Main Features:

1. Automatically Dividing Sketches into Spools: ESAPRO Spool automatically identifies spools within the entire line sketch (design sketch). This allows precise and timely line splitting, facilitating the prefabrication.

2. Generating Material Lists divided per Spool: The module automatically generates detailed material lists for each individual spool. These lists include all necessary components, ensuring that the prefabrication department always has complete information on the required materials.

3. Creation of Sub-Sketches with Dimensions: ESAPRO Spool automatically creates sub-sketches (spool sketches) with dimensions and material lists. This provides a precise and detailed graphical representation of each spool, facilitating the work of the prefabrication department.

4. Automatic Spool Labeling: Each spool is recognized and assigned an automatic number with corresponding labeling. This automated process ensures orderly and accurate management of spools, reducing the risk of errors and improving overall efficiency.

5. Enhancement of ESAPRO Isometrics: With ESAPRO Spool, the ESAPRO solutions range is further extended, effectively addressing the numerous issues related to intensive prefabrication of piping lines. ESAPRO Spool enriches the Isometrics module with advanced functions for spool management.

6. Customization and Flexibility: The module allows for customization and modification of settings according to the specific needs of the project, ensuring maximum flexibility in managing prefabrication.

7. Complete Integration: ESAPRO Spool integrates seamlessly with ESAPRO Isometrics and other modules in the ESAPRO family, ensuring a continuous and uninterrupted workflow.

ESAPRO Spool is the ideal solution to optimize spool prefabrication, enhancing the efficiency and accuracy of the overall process.

ESAPRO SUPPORTS

The main features

Product Description:

ESAPRO Supports is an add-on to the ESAPRO 3D Piping module that allows you to design 3D piping supports with precision and speed. This module offers a vast library of customizable parametric parts, simplifying the assembly of supports and enabling the generation of detailed construction drawings and material lists.

Main Features:

1. Customizable 3D Parts Library: ESAPRO Supports includes an extensive library of parametric parts commonly used in piping support design, such as attachments (U-Bolt, Collars, Reinforcement Plates), supports (Shoes, Saddles, Pedestals, Guides, Springs), fasteners (Bolts, Rods, Clevises, Turnbuckles), and structural elements (Beams, Plates, Squares, Racks). Each part has descriptions in multiple languages and can have its own part number. Special parts modeled in 3D directly in AutoCAD or imported from mechanical modeling software can be defined.

2. Simplified 3D Assembly: ESAPRO Supports functions make the 3D assembly of a support by joining basic pieces extremely simple. During the assembly phase, special features such as 3D snap point attachment, automatic alignment to existing objects, plane inversion and flip, 3D rotation, and moving objects on faces are provided. Commands for creating and modifying holes and inserting fasteners (bolts, nuts, washers) are available.

3. Steel Structures Modeling: The software includes a module for quickly creating structural steel elements. With fast and intuitive interfaces, you can create beams (IPN, UPN, IPE, HE, LEQ) from a customizable database and adapt them to your needs through shaping and editing commands. Commands for automatically creating portals (pipe-rack), columns, squares, poles, base plates, railings, gratings, staircases, ladders, and spiral staircases are available.

4. Automatic Generation of Construction Drawings: ESAPRO Supports generates 2D construction drawings from the supports modeled in the piping. You can decide the layout format and structure of the material lists. Graphic tools allow you to complete the drawing by adding position labels and any required dimensions. Synchronization between construction drawings and the 3D plant model is bidirectional: any changes to the model automatically update the generated construction drawings and vice versa.

5. Supports General Layout Labeling: ESAPRO Supports allows you to create a general layout drawing showing the placement of supports within the plant. Supports can be represented realistically or through conventional symbols that identify their function (fixed point, support, axial stop, lateral guide). Support tags can be shown through a manual or automatic labeling procedure.

6 Customizable Material Lists: The software generates material lists for the supports used (total weights), tag lists with the composition and weight of individual supports, and standard (primary) lists used with their composition. The list template mechanism allows you to define customized list formats including only the desired fields. Lists can be printed directly or exported in TXT or Excel format for further processing or integration with external software.

7. Maximum Compatibility with External Software: All files produced with ESAPRO software are simple DWG files containing only standard AutoCAD entities (lines, circles, blocks). No additional plug-ins (object enabler) or conversion tools are required to open or view these files. File exchange with other software is therefore extremely simple, as any software capable of reading the DWG/DXF format or any other format exportable by AutoCAD (DGN, DWF, PDF) is inherently compatible with the ESAPRO environment.

ESAPRO Supports is the ideal solution for optimizing piping support design, improving the efficiency and accuracy of the overall process.

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STRESS INTERFACE

The main features

Product Description:

ESAPRO Stress Interface is an add-on to the ESAPRO 3D Piping module that allows exporting 3D geometry to the most popular piping stress analysis software. This module ensures maximum safety and compliance in design, simplifying the process of transferring the necessary geometric data for stress analysis.

Main Features:

1. Export to Stress Analysis Software: ESAPRO Stress Interface generates neutral PCF files, facilitating data exchange with the most popular piping stress analysis products on the market, such as CAESAR II®, PASS/SUITE®, ROHR2®, and AutoPIPE®. This allows direct transfer of the 3D piping model's geometric data and any supports to the Stress Analysis software, eliminating the need for manual node coordinate entry.

2. Neutral File Generation for Stress Analysis Software: The module generates a neutral file containing all the geometric information of the piping line. Once the additional calculation data (load conditions, temperatures, material characteristics, degrees of freedom of constraints, etc.) are entered, the Stress Analysis software can calculate stresses and deformations, highlighting critical points of the line.

3. Full Integration with ESAPRO 3D Piping: ESAPRO Stress Interface integrates seamlessly with ESAPRO 3D Piping, leveraging the 3D plant model to ensure a continuous and uninterrupted workflow. This ensures complete consistency between the design model and the structural analysis.

4. Elimination of Manual Input: By automatically generating the PCF file, it eliminates the need for manual node coordinate entry, reducing the risk of errors and increasing the efficiency of the analysis process.

5. Maximum Compatibility with External Software: The generated PCF file is compatible with the most popular stress analysis software, ensuring broad interoperability and facilitating integration into the existing company workflow.

ESAPRO Stress Interface is the ideal solution for optimizing the structural analysis of piping lines, improving the efficiency and accuracy of the overall process and ensuring maximum safety and compliance in design.

ESAPRO HEAD LOSS

The main features

Product Description:

ESAPRO Head Loss is an add-on for the ESAPRO 3D Piping module dedicated to the precise and detailed calculation of head loss in pipelines. This advanced tool allows engineers to accurately evaluate head loss along the pipeline path, optimizing sizing and improving plant operational efficiency.

Main Features:

1. Detailed Analysis: Performs detailed analysis directly from the 3D model of the pipelines, ensuring accurate head loss verification.

2. Spreadsheet Generation: Produces a complete spreadsheet that highlights head losses for each pipeline component and the total loss along the analyzed section.

3. Standards Compliance: Complies with ASHRAE Handbook Fundamentals directives, ensuring design adherence to international standards.

4. Sizing Optimization: Helps optimize pipeline sizing, enhancing plant operational efficiency.

5. Complete Integration: Perfectly integrates with the ESAPRO 3D Piping module, ensuring a consistent and smooth workflow.

6. Intuitive Interface: Features an intuitive Excel-like interface and user-friendly tools for easy adoption and use by users.

ESAPRO Head Loss is the perfect tool for optimizing your pipeline systems, offering detailed head loss analysis and spreadsheet generation for accurate, standards-compliant designs.