VENTURIS it

TRiCAD ms

Plant Design

# Extraordinary software
# for intelligent plant design.

## TRICAD MS®

### Plant Design

- P&ID
- 3D Piping
- Pipe Categories
- Isometric Drawing
  (Iso X)
- Structural Steelwork

### Digital Factory Design

- Conveyor Systems
- Steel Platforms / Steel Construction
- Paint & Coating Systems
- Tractory Curves
- Crane Units
- Swarf Conveyors
- Layout Module
- Fire Protection Layout

### Building Services Engineering

- Building Module
- Heating / Coldness
- Ventilation
- Sanitary
- Electric
- Sprinklers
- Schematic/Infrastructure
- Fire Protection Layout

### Traffic Design

- Light-rail
  envelope curves
- Road vehicle
  envelope curves
- Layout module

Database (vDB)    Quality Check    Report Manager    Clash Detection    Construction Modelling    Viewer

## Contents

TRICAD MS

Plant Design

TRICAD MS® Plant Design

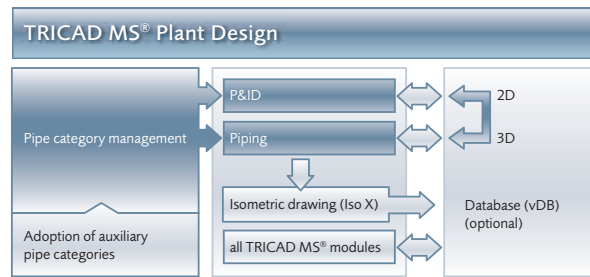| | | P&ID | | 2D |
| Pipe category management | | Piping | | 3D |
| | | Isometric drawing (Iso X) | | Database (vDB) (optional) |
| Adoption of auxiliary pipe categories | | all TRICAD MS® modules | | |

# Intuitive, smart and productive.

In view of the high number of orders in hand and the limited availability of plant design specialists, TRICAD MS® has chosen to upgrade its productivity continually to implement even complex plants with the available resources.

In each phase of your design use the benefits of intuitive operation in basic or detail engineering, block flow charts, P&I diagrams or 3D layout plans with this unique software. The modular design allows you to work in a variety of design sections at the same time. To expand your room for manoeuvre, TRICAD MS® Plant Design offers the use of a database – you can choose from Microsoft Access, Oracle or SQL format. The essential benefit is that in addition to linking plant design modules like P&ID and 3D piping you can also connect to other disciplines like structural steelwork, building services engineering, infrastructure and conveyor systems.

### Deposited data increases engineering power.
A well-designed structure supports you with data organisation and filing. This includes time-consuming search processes or past changes. All relevant planning data is defined uniquely and is centrally available for further planning. The resulting shorter planning times increase your competitiveness directly. With TRICAD MS® Plant Design, even without special knowledge or additional programming, you have the individual opportunity for expansion and adjustment. This gives you enormous flexibility of use.

### Global networking and simple implementation.
The benefits of a global and networked planning package are obvious: with more licences you can create a standard environment (env) for all modules. Internal and external construction engineers can correspondingly work on these company standards. Thanks to logical configuration you can use the software productively within a few days. Each module is set up the same way. All information is contained in the DGN file and can be transferred to a database for further use at any time. This is how the TRICAD MS® 3D model maps the complete plant.

### An overview of the essential benefits:
- Quick implementation and practice period
- Intelligent planning even without a database
- Low investment costs
- Global engineering (PID => 3D => ISO)
- Product-spanning construction for more than 10 building trades
- Rapid implementation of changes in the 3D model
- A variety of views or bills of material available by clicking
- General exclusion of collisions by the construction engineer (include product-spanning)
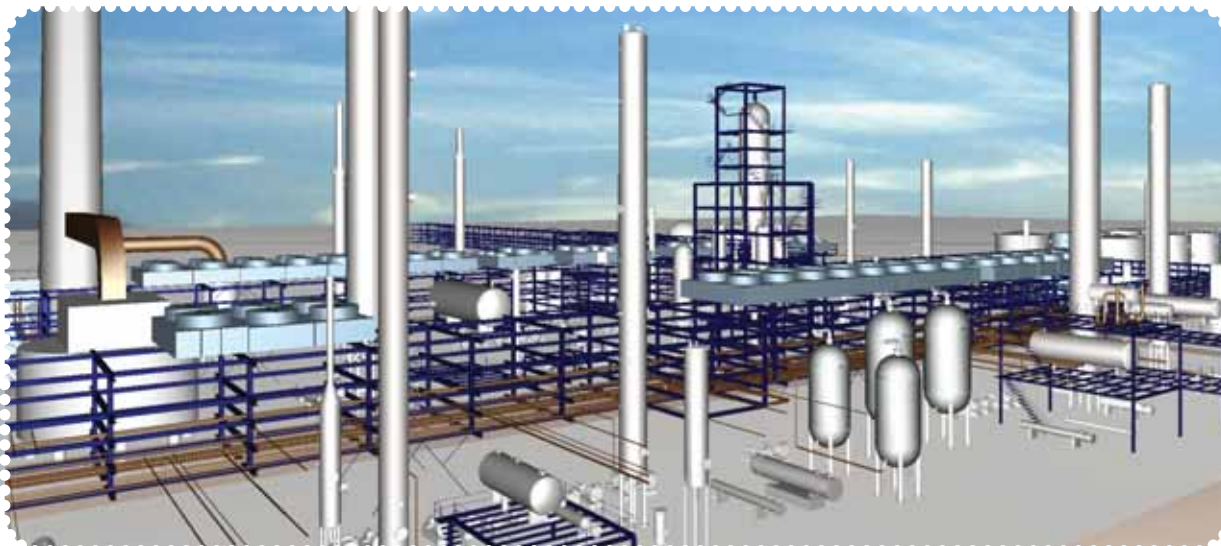
## P&ID

The P&ID module allows you to prepare and change block flow chart, processes and P&I diagrams. Your essential benefit is a combination of simple use and high-performance tool. Using ODCB links you can also connect the application to external data sources. Intuitive operation guarantees you short practice periods and high efficiency.

Well-designed model files ensure office, customer and project standards, for example data management structures, tools, labelling specifications, dimensioning, layout, etc., and allows you a productive quick launch. Comprehensive planning libraries, oriented towards EN ISO 10628 (formerly DIN 28004), are already contained in the delivery schedule. You can include order-specific specialities if needed in current projects and thus expand your planning foundation for the future. Automatically structuring the construction data, for example, allocating supports to each box, ensures clarity and "lean planning".

### Intelligent combinations make construction easier.
Connect individual plant components intelligently with each other using specifications and pipe categories as the basis for piping plans. Use intelligent objects to adopt fundamental design and planning data such as nominal width or pressure stages from already defined components. This allows you to easily prepare complex piping systems yourself and thus take into account all support components like fittings and valves, reducers or joints and fastenings. Round off your piping schemes by following the flow direction. Already positioned components such as flap traps are adjusted to each situation and can also be dynamically shifted ("elastic band function"), rotated or reflected using editing functions.

All current object data can be displayed and processed at any time using information assistants. Using cross-references you can support document-spanning work and open the next drawing with just a click of the mouse. Reduce errors with a variety of test routines including nominal width accuracy and connection consistency.

Labelling is done either through prefabricated masks and/or free input and supports you in defining footer blocks and device rails. Quantity surveying or assessment is done in the form of lists and/or specification sheets using Excel. As a basis of the assessment you can use both the drawing and the optional connectible database.





Plant Design
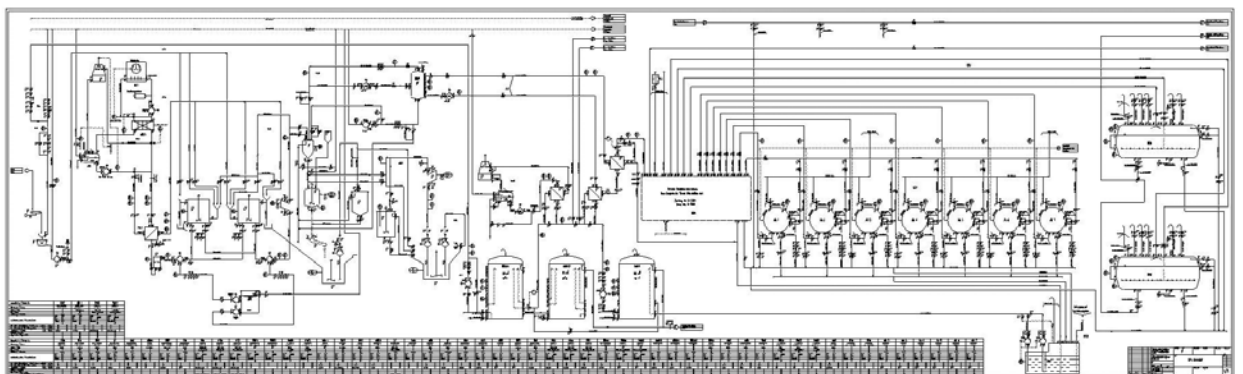
# 3D Piping

This 3D module allows you to construct and manipulate piping and plant components in the overall model. Whether you start with an empty document or rely on available volume models, 3D Piping is the professional tool for efficient engineering.

With the help of assistants to define boxes and devices together with equipment and comprehensive 3D component libraries you can quickly produce fixed plant parts. Six accompanying steel or stainless steel pipe categories are ready to be the basis for pipe construction. Supported by the "Accu Draw" function you can yourself construct complex systems with downward runs and surface or space gaps quite easily. To do this you can work "in free space" or with reference to construction units. Automatically prepare branches and blends corresponding to pipe category specifications. The "Auto Routing Function" helps you in planning and automatically closes gaps between related pipe sections.

Bent pipes and/or welded assembly groups can be constructed analogously. After inserting all support components, simply by clicking on the mouse you can produce the necessary joints and fastenings like flanges, seals, screws or welds along the entire pipe length. Using intelligent editing functions ("elastic band functions") you can shift support components of already detailed pipe sections along the pipe length – even around corners and over branches. If necessary you can even exchange pipe categories while the run is being constructed.

**Complete scope of functions for efficient work.**
To finalise the piping you can use other functions. You can implement layout sections in addition to separating cuts, bending devices or insulation. Complete the run construction with the models contained in the delivery schedule for holder systems including Sikla and Hilti. The information assistant offers you support at any time by displaying all current object data. Transferring your planning data, for example to produce isometric drawings with Iso X or for other calculations like ROHR2, completes the scope of functions.

You can easily define document formats and establish drawings in the layout and also prepare the dimensioning and labelling. Use the intelligent TRICAD MS® Cells for rapid work and to prevent keying errors. All values are directly read out from components. But process, project or office-specific components can also be quickly defined. Using dynamic modification constructions for pumps, fittings and valves or heat exchangers on the basis of intelligent Excel models, these components are immediately available to you after entering their geometric sizes for further planning – and all without extra training periods.

This module also of course offers comprehensive assessment possibilities in the form of lists and reports. The basis of your assessment in Excel format can be both the model itself and the optional database.

## Pipe Categories

This module offers you the ideal tool to define and manage standard units in the main pipe categories and easily establish project-specific pipe categories. You can use support components with the help of fully parametric model objects like pumps, ball valves, closure discs, etc. using Microsoft Office applications (Excel; Access). You can easily import inventory data from third party systems in MDB format using ".net-Programming". Take into account directly on each component additional materials or services like box collapse tests or crane work time for installing a heat exchanger as "material plus".

**Just a click from the main pipe category to a detailed project pipe category.**

Prepare specifications on the basis of comprehensive standard component catalogues. Parametric model objects allow you rapid and comfortable modification constructions. Provide both your geometric as well as business data in Excel tables. Structure your constructions using component and material codes. Store project-specific definitions in the project itself. Allocate pipe categories to various projects and create the possibility of multiple use. Use clear data masks and extensive component part drawings to define components and use them in the project. An authentication concept protects your standard and only permits released components into the project. This increases your planning security.
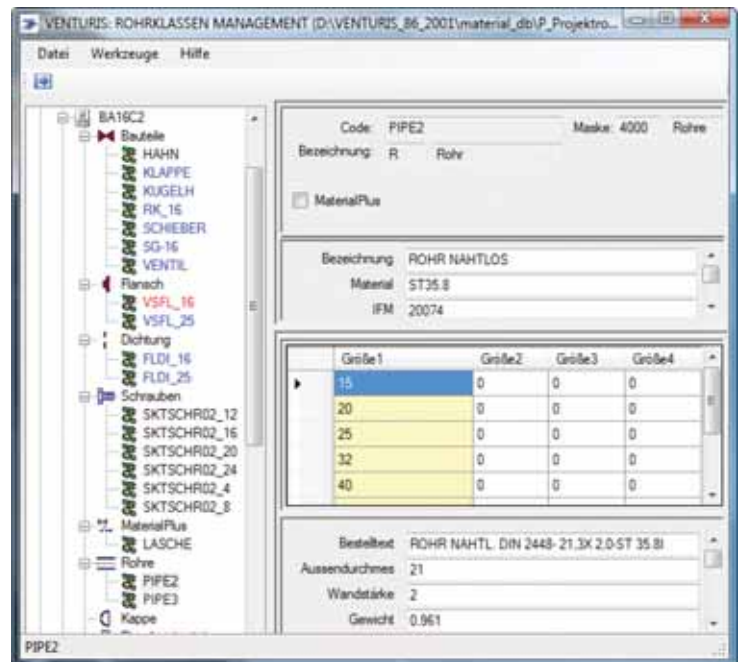
## Database (vDB)

A database is the central device for easy management of all the parts of your project. It is optional, can be connected at any time and is not absolutely necessary for planning. You can always make changes to unit characteristics and transfer them one by one to the drawing, using the opportunity to define additional properties even during the current project.

**The perfect data processing power tool.**
Operate the database and drawing surface in parallel. Determine changes or extensions yourself. Prepare alternatives to your current constructions or structures without bindingly establishing them. Avoid double data entry and transfer errors by linking 2D drawings and 3D layout plan.

A database allows you to connect all other modules of the TRICAD MS® product range and interactions with them. Enhance your productivity using effective organisational and structuring tools. Manage different designation numbering systems like DIN and AKS simply and at the same time. This allows you to detail your project either for processes or functions.

Apply the AKS structure either in the three hierarchy levels – overall plant, functional overall system and aggregate – or taking into account the accessories or signal type plate on four levels. You can obtain a variety of information at any time using the table view and tree structure. Expand these with detailed information of the current object being processed. Use the extensive filter functions already in the delivery schedule to focus on particular components or plant areas such as "all revac valves, PN10; DN65".

Use the link between data record and drawing object, supported by a highlight function, to find components in drawings. Export your data easily to Office applications like Microsoft Excel. Link externally prepared documents and specifications directly to the object, for example the nominal line of a pump or the specifications sheet of a heat exchanger. Inherit important information in subordinate objects and thus make descriptive double entries superfluous. Obtain additional planning security using extensive test routines and also taking into account linked graphical objects.
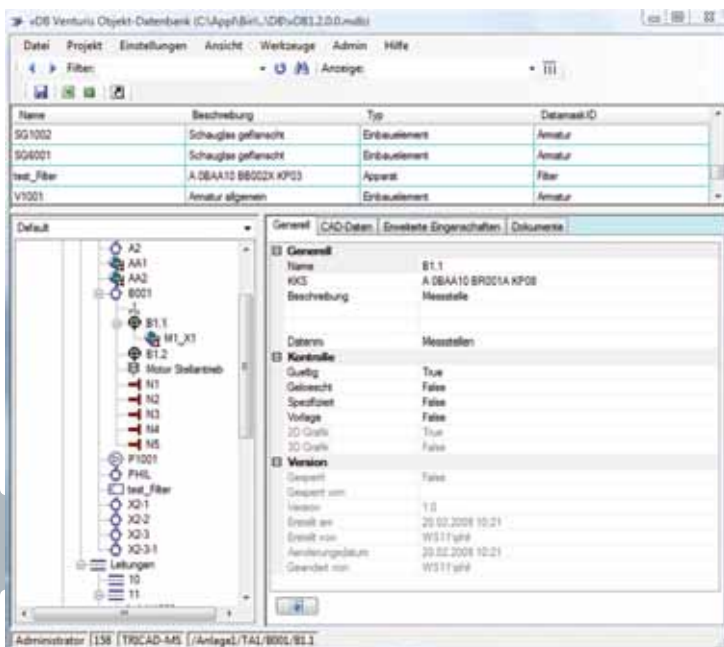
## Isometric Drawing (Iso X)

This module allows you to fully automatically generate isometric drawings based on 3D piping design. With just one click you can transfer all components and extension components as isometric drawings in original DGN format. Automatically set position numbers, bills of materials and weld lists based on them complete the results.

Assistants for defining customer and/or project-specific assessment regulations (so-called styles) support you in developing individual representations. Use colours and line types, line width and level structure or displays of weld spots, pipe bends, joints and fastenings with more than 140 option buttons. Document format, drawing headers and title blocks round off the specifications. This usually makes revisions of prepared isometric drawings superfluous.

You can also prepare complex pipe courses with downward runs, surface and space gaps, outlets or tiers in seconds. Include as a matter of course space coordinators, deposit positions or bevelled hatching. Automatically – if necessary – produce the task on several pages or files. The content and scope of the isometric drawing thus fulfils all your requirements "under time pressure".
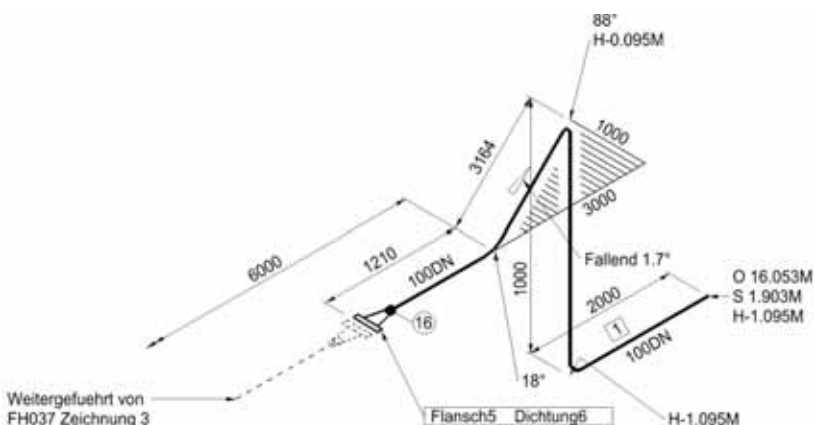
## Report Manager

The Report manager module allows you to prepare lists, assessments and specifications uniformly over all TRICAD MS® modules. The data output is produced in Microsoft Excel, guaranteeing simple use, e.g. for a calculation. Models extensively included in the delivery schedule provide you with documentation at the click of the mouse.

You can produce single or bulk bills of materials with or without headers using a drawing or spanning drawings from the database. Joints and fastenings like screws and welds are taken into account as a matter of course. Special filters help you select, structure and prepare data. In addition to excerpting data you can position bills of materials on the drawing. You can implement your special requirements in regard to appearance, structure and content without extra programming effort.

## Construction Modelling

Construction modelling allows you to prepare buildings easily and quickly as volume models. Position floor slabs and floors easily by arranging their corner points. Place walls on start and end points, if you like in relation to outer edges, inner edges or central line. Both component types are automatically adjusted to the preset values of each floor. You can alternatively select existing continuous lines in a 2D plan. The walls are automatically erected according to their specifications. Deposit appropriate materials for all components. Insert openings and later change them. Easily and quickly insert finishings like windows and doors in the walls at any time.

# Structural Steelwork

The combined platform and structural steelwork module allows you to prepare simple routine layouts both in 2D and 3D models. You can also of course use the accompanying reporting and dimensioning of all components. You will find all current DIN profiles and additional country-specific structural steel sections deposited in catalogues. You can construct steel girders in any MicroStation window, either in a 2D or 3D view. Erect time-saving pipe-bridges, for example, with reference to a 2D polyline. Complete the pipe bridge with the necessary support and mounting system from the 3D piping module.

Erect flexible platform, surface and openings using freely definable polygons. Automatically cover separating borders prepared as 2D polygons with 3D steel girders. This allows you to take into account the blending priorities for supports and openings in addition to selected reference edges like "aligned above" or "centre line of gravity". Use a variety of types of section ends in the form of cover strips, mitre or slot welds for presetting during construction and adjustment later. Cover passable surfaces with detailed grid or plate bases or simple bases.

**An overview of additional functionalities:**

- Semi-automatic construction of rails including pecification of handrails, knee strip, side guard, baseboards and post profile
- Positioning of parametric steel stairs while setting threshold values for measuring steps, comfort and safety
- System-side check of these threshold value during construction
- Execution of stairs as plate or stud plate
- Easy creation of ladders and flexible change and display corresponding to the profile of the main measurements, distance between the rungs, wall fixtures, safety cage and flared bottom
- "Free form" input of any steel structure into the space while the degree of detail in the graphic display can be manipulated in various ways
- Completed layout models can be transferred to a production-oriented structural steelwork programme like "bocad" via the SDNG interface. Reading in adjusted profile values is also possible
- Selection of components by a sample database with more than 100 stairs, more than 25 ladders and 10 different types of rails

## Interfaces and Stress Calculation

## NavisClashBack

This module allows you to optimally shape daily planning with tight deadlines, low budgets and where there are several specialists working together. Before starting the planning collect as much information as possible to produce an optimal performance. Exchange data between the different disciplines and trades and thus between different applications.

TRICAD MS® Plant Design offers you many high-performance interfaces for data exchange, better cooperation and error-free information. Use layout plans for your plant design. Select the geometry for stress calculating your pipe system. Reintegrate updated data into your planning.

Some standardised interfaces in detail:

- Bidirectional data exchange for structural steelwork sections with SDNF
- Use of external data sources using ODBC connections
- Read-in, process and store CAD external formats with TRICAD MS® Functionality
- Transfer of planning bases to calculation programmes
- Updating of bills of materials and passing on to procurement, execution or accounting
- Compliance with planning standards such as pipe categories from a variety of planning systems

This programme allows you to read any Autodesk®-Navisworks®-XML collision file. NavisClashBack checks whether all drawings belonging to the entered collisions as master or reference files are loaded in MicroStation and displays missing DGN files.

Display all collisions at once in MicroStation and then process them. By clicking on the listed collisions centre the colliding units in a set view and mark them with a ball on the collision point.

To allow you to quickly find the complex models, the following aids are available:

- Extract external reference files
- Extract all objects from collision units
- Flashing display of collision units
- Automatic preparation of segment volumes around collision units
- Display of collision density
- Simple change in size and display of marking ball

Escape and rescue plan
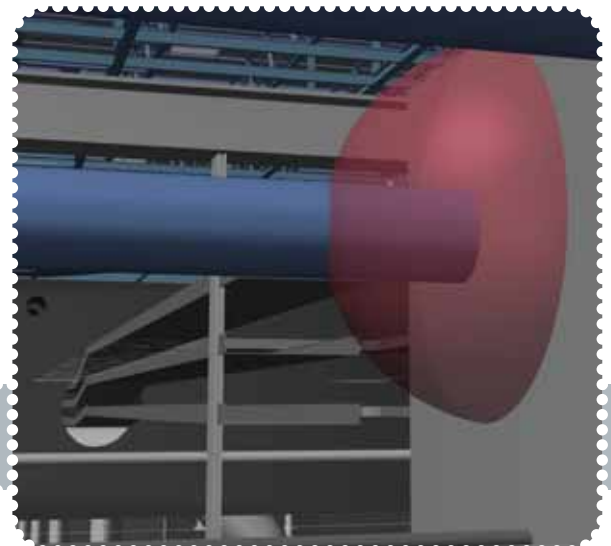
# Fire Protection Layout

Use the TRICAD MS® Fire Protection Layout to prepare escape and rescue plans, complete with fire protection symbols, guides and labels, and including planning of direction arrows, area identification and edge markings.

This module was developed for Daimler AG. Care was taken to achieve easy expandability and adaptive functionality, so it can be used successfully throughout the world.

Its use was adapted to the entire TRICAD MS® product assortment, so every TRICAD MS® user can quickly learn to use this module. Cells saved by the user can be made globally available by the key user, so double cells and the time needed for them are now things of the past.

With the TRICAD MS® Cell Selector, cells are placed in MicroStation drawings. The program reads various XML files and graphically replicates the XML tree structure. The cells assigned to the active XML node are listed, and the attributes and graphics belonging to the active cell are displayed. The cell can be placed by double-clicking on the cell in the list box. The tree structure can be built up independently of language; all displayed texts are replaced by the layout program depending on the set language.

With the list function, the layout cells in the MicroStation file can be recorded in terms of their number, and the attributes in the cells can be evaluated. The list is output through a Microsoft Excel file (optional).

The rules of behavior in case of fire and in case of accidents are presented clearly and in short, concise form. For the behavior in case of fire, the same presentation is normally chosen as for the Fire Protection Code Part 1.

The escape and rescue plans are presented in accordance with DIN 4844-3 and BGV A8 (German Employers' Liability Insurance Association regulations). Especially in public buildings, it can also make sense to prepare the documents in multiple languages.

With this tool, owners and operators of buildings and large-scale facilities can easily meet the legal obligation to post escape and rescue plans "when location, extent and type of use of the workplace require it" (§4 par. 4 Arbeitsstättenverordnung (German Work Safety Regulation ) of 20 July 2007):
- the building floor plan or parts thereof,
- the course of escape and rescue routes,
- the location of first-aid equipment,
- the location of fire protection facilities,
- the location of assembly points,
- the location of the viewer.

**Highlights:**

- Placement of fire protection symbols
- Leader lines
- Planning of direction arrows
- Symbol groupings
- Adaptation of symbols
- Expansion of symbols
- Dimension evaluation

**Symbols:**

- Fire protection symbols
- Rescue symbols
- Hazard symbols
- Firefighter symbols
- Own symbols

# TRICAD MS®
# Building Services Engineering

In addition to Plant Design TRICAD MS® fulfils all your requirements for CAD Building Services Engineering solutions. Whether you want to design simple or highly complex installation plants our high-performance construction module offers you comprehensive support.

**In detail the following modules are available to you:**

- Building Module
- Heating / Coldness
- Sanitary
- Ventilation
- Sprinklers
- Electric
- Schematic / Infrastructure

Use these construction modules to design, calculate and assess complete plants for technical building services. The size of the plant thus plays no role. The modules are practically identical in working method. The construction itself takes place in 3D mode – whether in front view, top view or isometric drawing.

Define pipe or conduits simply by selecting start and end points. Automatically set bends. Expand your work intuitively with formed parts as in Lego modular design. You can freely set the parameters at any time. Using Info button easily show and change all attributes of individual objects. This will enhance accuracy and improve your productivity. A full hatching of conduits, pipes and components and a display of covered edges (online) as well as a cable model come as standard.
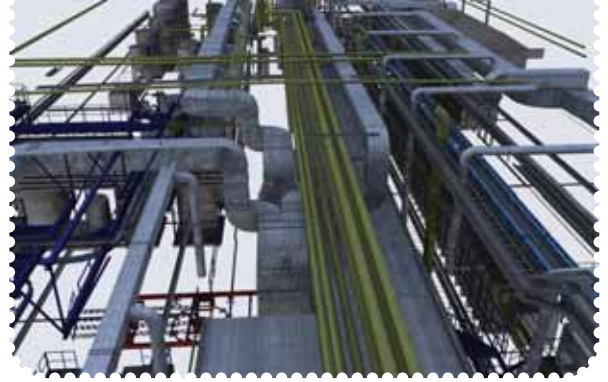
Using layout generation prepare plot layouts with automatic generation of shadow and tier symbols as well as covered edges. You can convert all attributes (object data) into DWG file format, especially for the AutoCAD® area. This makes it easier for AutoCAD® users to read out the complete TRICAD MS® information using object attributes without applications.

For calculations you are provided with appropriate programmes over the entire range of technical building services. Mass assessment takes place using Report manager via Microsoft Excel in each module and can be easily edited.

Implement gap planning – independently of the architecture – at any time in each trade. Prepare legends for the positioned components automatically in the model. The labelling of the object is associative and thus changes by itself.

Map plants using a tree structure as in Explorer. Search and change components easily.





TRICAD MS

Plant Design

# TRICAD MS®
# Digital Factory Design
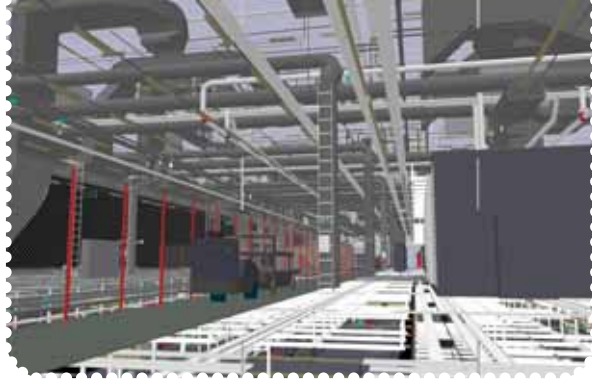
In the Automotive factory design segment TRICAD MS® has in the last few years developed into an essential application for the German automobile industry. In cooperation with the VDA (Verband der Automobilindustrie/German Automotive Industry Association) VenturisIT has implemented several CAD orders to complete the layout product range in the context of the digital factory.

In addition to the automobile industry TRICAD MS® is also involved in many other factory design market segments. On the basis of its ability to penetrate into technical building services and plant design, you can cover the digital factory planning with just one tool. This means that TRICAD MS® represents the ideal addition to your company.

**Using the following modules determine which application you would like to handle:**

- Conveyor Systems
- Steel Platforms/Steel Construction
- Paint & Coating Systems
- Logistics Planing & Tractory Curves
- Crane Units
- Swarf Conveyors
- Layout Module

*You can obtain more information from the TRICAD MS® Building Services Engineering and TRICAD MS® Digital Factory Design brochures that we can send you if you wish.*

Using this unique variety of planning modules, combine and network all relevant building data in three-dimensional virtual mode. Use TRICAD MS® to optimise the intelligent depositing of data. This allows you to implement your ideas in a unique environment while saving time. Its essential advantage is that even with complex projects your construction engineers will not work with several different tools but always remain in their usual environment.

Make data constantly available by just entering everything once. This considerably reduces your consumption of time and energy. Use TRICAD MS® to increase your productivity. Thanks to a simple structure, within a few days you can work productively with the software. Each module is built in the same way. There is no need for a database, all the information is contained in the DGN file.

Its special features include the fact that all components come in a parametric geometry and can be configured in any way you like. Hence the TRICAD MS® 3D model allows you not only to map the complete building or factory, it also guarantees your investment in training and building data, thus creating direct competitive advantages with a high level of flexibility.

## TRICAD MS® Licensing Model

Each software package installed at your company needs a licence. Use the various options offered by the TRICAD MS® modular licensing model:

- Local licence (single terminal solution)
- Floating licence (flexible server solution)
- Floating licence with check-out
  (all the benefits of a server licence without foregoing the flexibility of a single terminal)

If you check your software status and have to order missing licences again, we will be happy to help.

## MicroStation System Software

MicroStation V8 XM is the CAD basic platform for using the TRICAD MS® product range. This platform-spanning high-end CAD solution is operated world-wide in various market segments and forms the basis for all your constructions and models, plot management and the graphic display of your work. You can attach data in DGN, DWG and DXF format using reference technology. A hybrid treatment is likewise possible. A floating licence is installed in the form of a service on a Windows server.

## System requirements

| | |
|---|---|
| Hardware | Current standard PCs or notebooks |
| Operating system | Windows XP Professional or higher |
| CAD core system | MicroStation V8 XM Edition/ PowerDraft 2004 Edition or higher |
| Display screen | Single or double screen solution possible |
| Graphic cards | All graphic cards that are permitted for MicroStation, at least 256 MB or higher |
| RAM, memory | At least 2 GB, fixed disc >100 GB |

## VenturisIT and TRICAD MS®

Together with TRIPLAN Engineering, VenturisIT has in the last 20 years invested in employees, software and technology in order to develop a general range for customers in edificial engineering, plant design and digital factory planning.

With the introduction of the TRICAD MS® product range for PC-based 3D construction, VenturisIT has set a milestone in the engineering market. Worldwide, considerably more than 3,000 installations and more than 450 employees in the group of companies have made us one of the leading suppliers and developers of IT complete solutions. The resounding success of TRICAD MS® confirms us in the aim of continuing to offer solutions and process-oriented IT products and concepts appropriate for them, guaranteeing our customer the maximum use of cutting edge technologies.

TRICAD MS® has also contributed decisively to the success of the global integral planning of German car manufacturers in digital factories. This strategic goal has led to all highly complex factory plants revamps and rebuilding being visualised three-dimensionally before implementation.

All essential professional trades are considered for various planning concepts in a virtual space and checked for constructability. Today VenturisIT is an international software company which creates synergies with its customers. Together we are pursuing the goal and vision with which our company was founded: Innovation as the means to an end and not an end in itself.

This brochure was sent to you by:

### Head office

**VenturisIT GmbH**
Auf der Krautweide 32
65812 Bad Soden
Germany

Tel.:  +49 6196 76129-0
Fax:  +49 6196 76129-50

info@VenturisIT.de
www.VenturisIT.de

### References

- Audi
- BASF
- Bayer Schering Pharma
- BMW Group
- Caverion
- Daimler
- Eisenman
- Fraport
- Henkel
- Imtech
- Kuka
- Miele
- Seat
- Siemens
- Skoda
- Volkswagen

TRICAD MS® is a registered trademark of VenturisIT GmbH.

www.tricadms.de