



## Specialized tools for specialized work: Autodesk Inventor Professional.

Start with the world's #1 selling 3D mechanical design software, Autodesk Inventor® Series. Add specialized functionality for cable and wire harness, tubing and piping, and importing PCB IDF files. On top of that, include FEA functionality, powered by industry-leading ANSYS® technology, to conduct stress and strain analysis directly in the Autodesk Inventor® application. Now you're talking about **Autodesk Inventor® Professional**. Not only is it a powerful 3D tool, but it's also the best way to connect design teams with manufacturing engineers. Because it can integrate your existing 2D designs into your 3D design environment, it's a safe and easy path to specialized 3D design. Autodesk Inventor Professional is another example of how Autodesk delivers the right tool for the job.

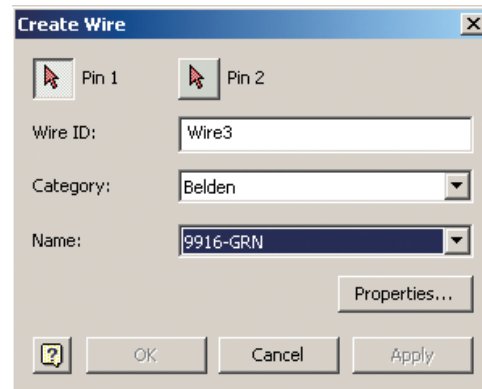
### CABLE AND HARNESS

Create virtual models of cable and wire harness designs inside Autodesk Inventor.

[Use Powerful Tools to Design Your Complete Product Line](#)

#### Wire Creation

Creating wires is easy with Autodesk Inventor Professional. To create a wire, simply specify two electrical points to be connected, and the software automatically adds a wire. As your harness design progresses, the software maintains proper electrical connections.

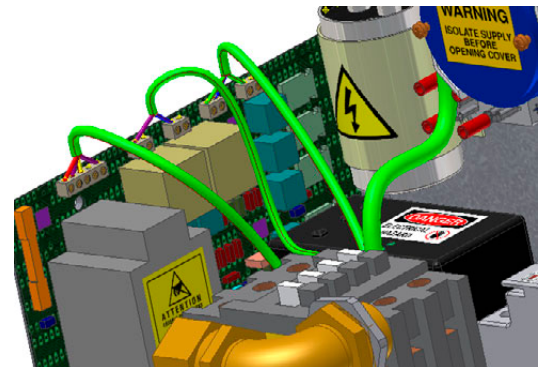


Wires represent both the physical geometry (diameter, color, length) of the wire and the electrical data (wire ID, signal name, and from/to connection information). You create all the appropriate Autodesk Inventor geometry with one simple command. What's more, these intelligent wires move with their connectors, establishing and maintaining electrical intent in a way that's similar to the way you work with mechanical design intent.

#### Harness Path Definition

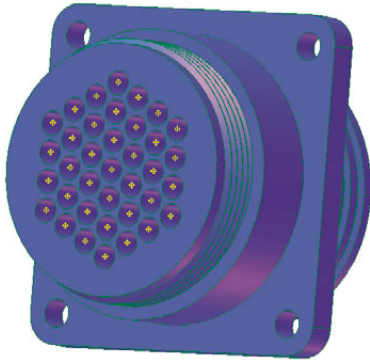
Visualize harnesses in your 3D model and make the most of intelligent design trade-offs with confidence that there is sufficient room for your electrical system.

Define harness and cable paths using a point-and-click method that creates 3D virtual conduits in your model, with points easily added or moved to refine the shape of the harness. With Autodesk Inventor Professional, you can create associative relationships to ensure that your harness automatically updates as design components change.



#### Electrical Part Creation and Placement

Quickly and easily establish the foundation for electrical connectivity by identifying the specific locations of electrical components. Add electrical pins and properties to Autodesk Inventor parts, then place them into assemblies using standard part placement features. Each electrical part in a harness has a unique reference designator that makes it easy to map the part back to the electrical data.

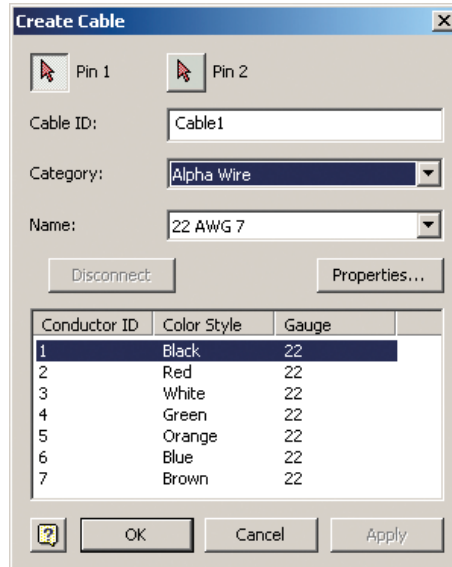
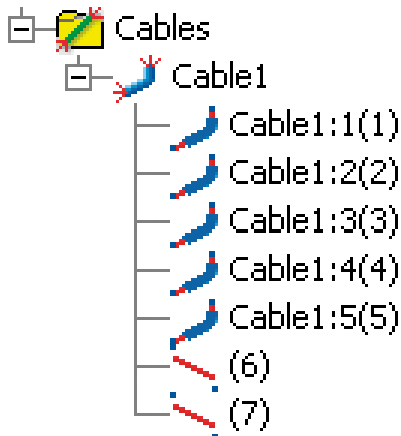


## Multiconductor Cables

**New** Improve quality and prevent errors by tracking individual cable conductors and their connections and routing paths. Eliminate waste by creating a more complete bill of materials that includes accurate cable length and quantity data.

Create intelligent representations of multiconductor cables, track which conductors within a cable are in use or available, and use route and unroute commands so that all wires within a cable are routed together. You can also

- Use existing wire list import functionality to import cables automatically
- Create bills of materials that accurately display cable data rather than individual wires
- Create configurable reports on cables



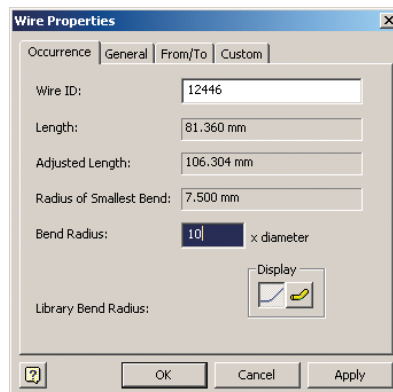
## Instance Properties on Pins

**New** Enhance the accuracy of manufacturing outputs by adding instance properties to pins. This gives you the flexibility to track such items as terminal part numbers, extending current functionality that supports parts, wires, and segments.

## Create Quality Products the First Time Around

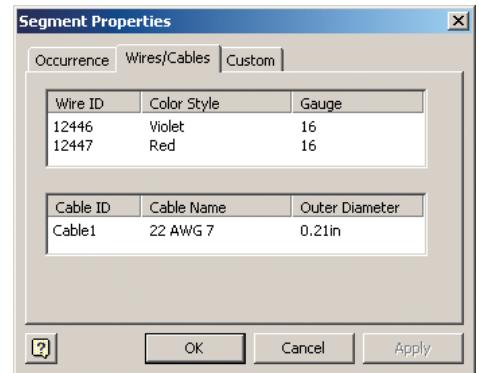
## Wire Length Calculation

Replace the time-consuming process of manually measuring a hardware prototype with a virtual prototype that generates highly accurate wire lengths and updates them as your design changes. Whenever the wire path changes, the length is automatically recalculated.



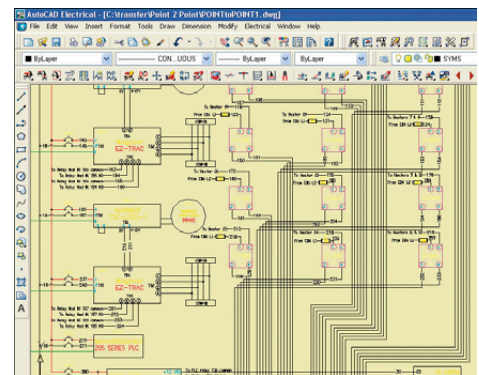
## Bundle Diameter Calculation

Use 3D visual inspection and interference detection tools to accurately determine whether wire bundles will fit your assembly. The software automatically calculates bundle diameters whenever you add or remove wires, even accounting for the air gaps between wires.



## Link to Electrical Designs Created in AutoCAD Electrical

Make sure that the 3D wiring design matches the electrical schematic from the start. Transfer electrical connectivity from AutoCAD® Electrical to Autodesk Inventor Professional with a Wire List file, one of the standard AutoCAD Electrical reports.

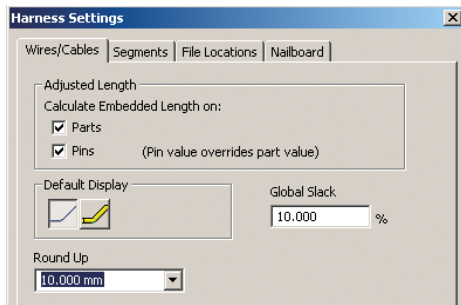




## Length Compensation Features

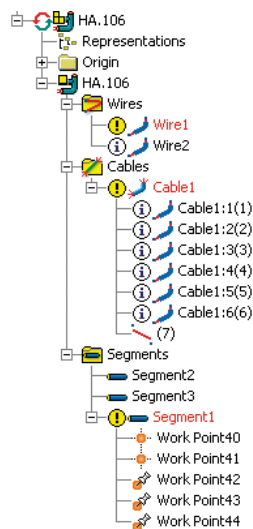
**New** Take control over wire and cable lengths to reduce scrap and manufacturing delays caused by wires that are too long or too short. This feature allows you to

- Account for the amount of wire used beyond the point where the wire enters the connector
- Globally add extra length to wires and cables based on a percentage of their lengths
- Round up wire length to the nearest specified unit (nearest half inch or 5 millimeters) to account for the way manufactured wires are cut



## Bend Radius Checking

**New** Improve cable quality, enhance manufacturing, and avoid costly recalls by automatically checking that wires are not bent tighter than their minimum bend radius. Identify points of failure due to tight turns and test manufacturability of bends along large bundles.

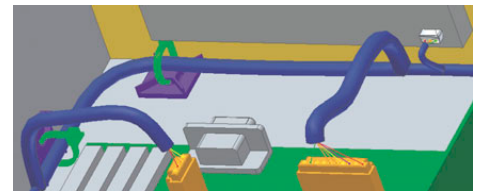
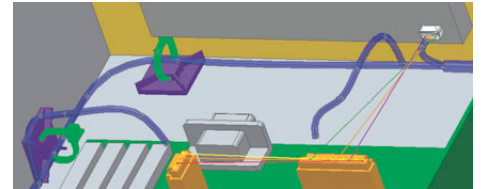
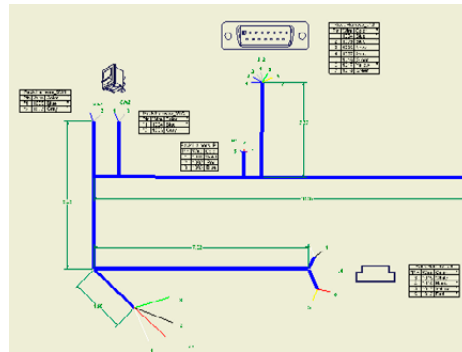
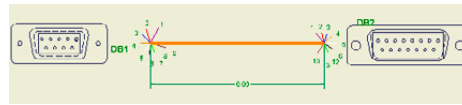


## Deliver Designs in Less Time

### Nailboard

**New** Quickly create accurate 2D harness documentation with intelligent properties and dimensions that automatically update as the 3D design changes. This will reduce errors caused by manual creation and multiple design iterations.

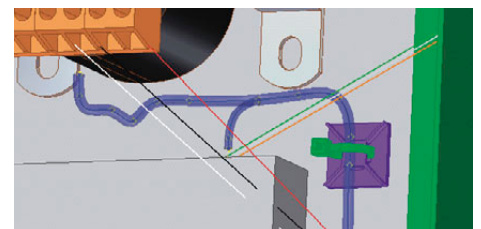
It's easy to manipulate and annotate an associative 2D representation of a 3D harness or cable. You can add pin, wire, and connector properties; create 2D views of connectors; add dimensions to actual wire and bundle lengths; and supply other data needed for manufacturing.



### Wire List Import

Quickly import hundreds of wires using a configurable From/To list. Maintain electrical design intent when importing wire lists into your 3D mechanical assembly, and detect missing connectors, pins, and wire definitions during the importing of wire data.

	A	B	C	D	E	F
1	/Wire ID	Wire Name	From	Pin	To	Pin
2	1001	20AWG-VIO	J3	4	P1	1
3	1002	22AWG-RED	P1	2	J3	3
4	1003	20AWG-BLU	J3	2	P1	3
5	1004	20AWG-BLU	J12	1	SW2	1
6	1005	20AWG-BLU	J12	2	SW1	1
7	1006	22AWG-GRY	J12	3	SW2	3
8	1007	22AWG-GRY	J12	4	SW1	3
9	1008	24AWG-RI K	SW2	2	P1	5



### Wire Routing

Use automated and manual wire routing options to quickly route thousands of wires while maintaining complete control over the paths of critical wire. Wires are inserted into segments using three routing functions:

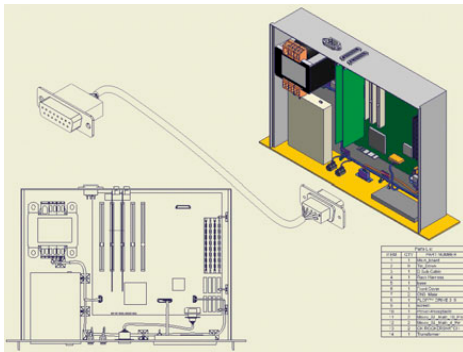
- **Manual routing** requires explicit selection of a wire's path.
- **Interactive routing** requires selecting the start and end points of the routed path to let an algorithm choose the shortest path.
- **Automatic routing** finds the shortest possible path based on all available paths.



## The Fastest Way to Production-Ready Drawings

### Assembly Documentation

Instead of relying on digital photographs or rough sketches, use Autodesk Inventor Professional to quickly and accurately include details of the location of cable harnesses in your assemblies. Since cable and harness geometry is native to the Autodesk Inventor program, you can easily create assembly documentation using standard Drawing Manager functions.



### Report Generation

Streamline and automate the creation of reports through centralized data storage. Use the report generation utility to define report templates and run reports such as wire lists, termination charts, cut tables, and others needed to design and manufacture harnesses.

## Communicate and Manage Design Data More Effectively

### XML Output

**New** Integrate wiring data into your design process by creating macros and other utilities that access harness data and output it in an XML file. The new XML Output function provides a complete description of your harness assembly in an easily readable, language-independent file.

### Vault Data Management

Autodesk® Vault makes data management more efficient by organizing and protecting your design data from inadvertent changes. This

easy-to-use data management tool makes work-in-process data more accessible and reusable, while avoiding the inherent versioning problems of sharing files among workgroups. Most importantly, Autodesk Vault is tightly integrated with Autodesk Inventor Professional, making data management easier than ever. For more information, visit [www.autodesk.com/vault](http://www.autodesk.com/vault).

## Learn and Deploy Quickly

### Familiar Interface

If you already use Autodesk Inventor software, Autodesk Inventor Professional is easy to learn and use. By taking advantage of the familiar Autodesk Inventor interface, you avoid the need to learn new software so you can see immediate benefits.

### Advanced Help System

Speed transition to 3D with contextual help. The award-winning Design Support System (DSS) offers browser-based support and an electronic infrastructure for easy learning so you can get up to speed quickly.

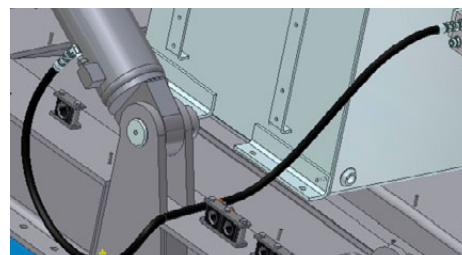
## TUBING AND PIPING

Automate the creation of tubes, pipes, and flexible hoses in Autodesk Inventor assemblies.

## Use Powerful Tools to Design Your Complete Product Line

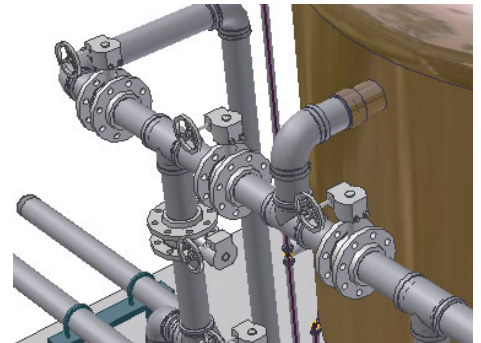
### Flexible Hose

**New** Make sure your flexible hose and fitting designs fit properly by creating a virtual prototype that provides accurate manufacturing documentation. Use the new 3D spline-based method to create realistic hose models. The software checks the minimum bend radius and automatically calculates and includes hose length in length roll-up commands.



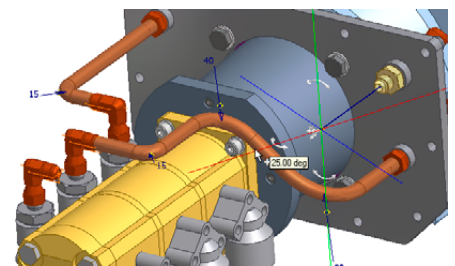
### Pipe Routing

Create and modify pipe routes quickly and easily by selecting a start point, an end point, and any number of intermediate points to define the route. Complete associativity with your drawing means that pipe routes automatically update when your 3D assembly changes. A rules-based approach automatically conforms your model to design rules such as minimum or maximum length criteria, helping you become more productive.



### Rigid Tube Routing

Quickly create rigid tubes with superior control over the shape—including an arbitrary number of bends, bend angles, and radii. The radius and rotation handles offer greater control over the shape of a rigid tube.



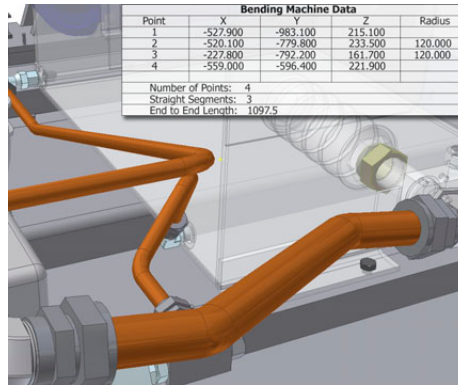
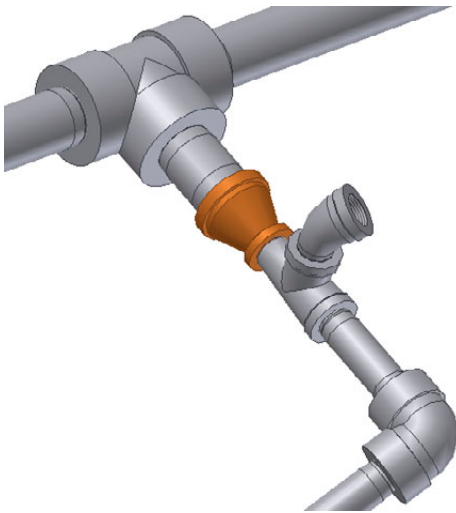
### Custom Bends in Pipe Runs

In real-world piping designs, you may need to bend a pipe rather than insert an elbow. The Custom Bend command provides flexibility and control even for nonstandard designs. You can create bends of custom radius and angle with the familiar methods used for rigid tubing.



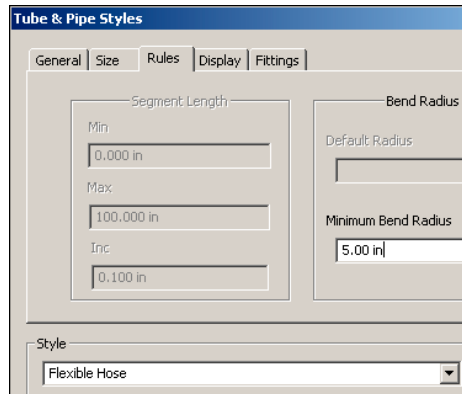
## Adjacent Fittings

**New** Streamlined tools help you place adjacent pipe fittings and support more complex piping designs with the capability to build “chains” of fittings in a network of pipe routes.



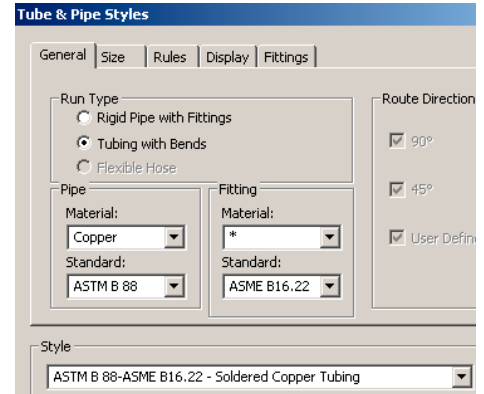
## Design Rules

Enhance the quality and manufacturability of your designs with tube and pipe runs that automatically adhere to preset standards. Configure design rules and determine minimum segment lengths, bend radii, and maximum length between couplings. You can also specify the appropriate fittings for a given pipe style.



## Styles

Be confident that all components in your design fit together properly by using styles to set design and manufacturing standards. Quickly define materials, sizes, standards, and design rules for each type of pipe that you use—and change an existing tube or pipe run from one style to another.



## Route Editing

Save time by using advanced feedback and editing methods to easily make changes to tubes, pipes, and hose as your design evolves. Edit routes by dragging segments and moving, adding, or deleting nodes, and see detailed feedback when editing causes a complex change. Glyphs indicate the directions you can drag a segment, and segments turn red when they violate your design rules.

## Deliver Designs in Less Time

### Creating Routes

Automatically populate piping routes with real parts that adhere to your manufacturing standards. The Populate Route tool turns tube, pipe, and hose routes into physical pipe runs, automatically placing fittings, pipe segments, rigid tubes, and hose as needed. Standard Autodesk Inventor parts are created during this process to make it easy to perform mass property calculations and interference checks. What's more, couplings are automatically placed when pipes reach their maximum length, and you can specify length cutoff increments.

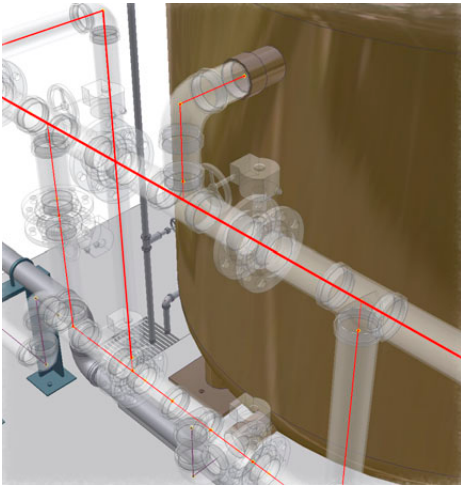
## Create Better Products the First Time Around

### Fittings Library

Eliminate tedious searching by quickly and automatically accessing the correct part from an extensive library of piping components. The library includes commonly used, industry-standard ISO, ANSI, DIN, and JIS fittings and parts, and can be extended to include additional components. A publishing wizard speeds you through the process of preparing data to use with Autodesk Inventor Professional.

### Tubing Bend Tables

**New** Save time and reduce errors by automatically generating bend tables based on 3D data. You can create ASCII bend tables in standard XYZ or YBC formats to provide details to manufacturing.



### Initial Fitting Placement

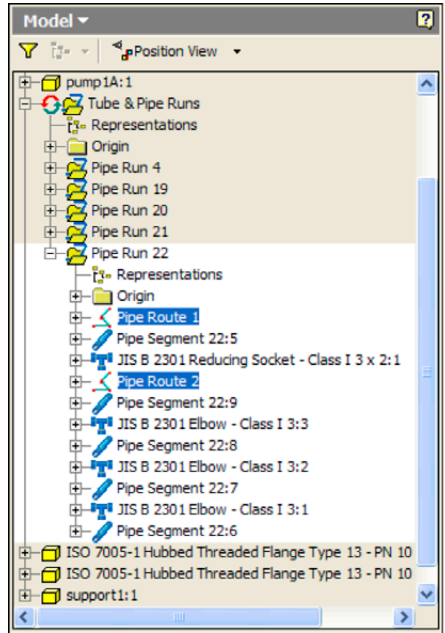
**New** Streamline your workflow and create pipes, tubes, and hose more quickly with greater control over your piping structure. Quickly place fittings into a pipe run assembly, and then initiate pipe routes.

### Styles

All components in your design will fit together properly when you use styles to set design and manufacturing standards. Quickly define materials, sizes, standards, and design rules for each type of pipe that you use—and change an existing tube or pipe run from one style to another.

### Flexible Pipe Run Hierarchy

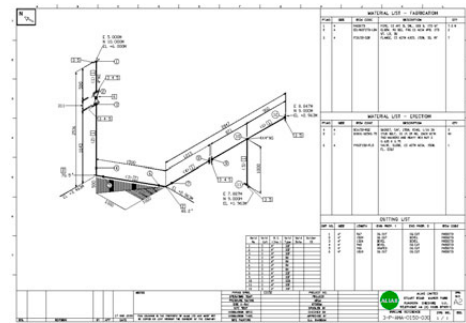
**New** Take more control over your design with a flexible piping hierarchy that helps you create drawings faster and generate BOM data that represents the proper assembly structure. The restructured pipe run and route hierarchy gives you more control over piping design. Now it's easy to correlate a single pipe run to a single part number that represents an entire piping assembly or spool. Each pipe route has its own style definition, and you can use multiple styles in a single pipe run.



### Fastest Way to Production-Ready Drawings

#### ISOGEN PCF Output

**New** Use the Piping Component File (PCF) output to reduce errors by automatically creating isometric pipe drawings with third-party applications. Create PCFs to use as an interface to the industry-standard Alias ISOGEN software. Based on your PCF input file, ISOGEN creates a DXF™ or DWG file containing the isometric drawings.



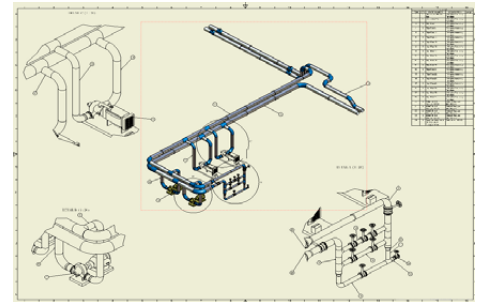
#### Parts List Length Roll-Up

With roll-up and ballooning capabilities, you can communicate more accurate information to purchasing and manufacturing. Configure your parts list to collect all tubing, piping, and hose of a specific type and display it as a single line

item with length totals. Use balloons to easily display the individual length of a pipe that is part of a summed row. Each material of tubing used in the assembly has a unique part number and its own line in the parts list.

### Assembly Documentation

Quickly and easily include accurate details about tubing, piping, and hose locations in your assemblies. Since all the tube and pipe geometry is native to Autodesk Inventor, you can easily create assembly documentation using standard Drawing Manager functions.



### Familiar Interface

If you already use Autodesk Inventor, Autodesk Inventor Professional is easy to learn and use. By taking advantage of the familiar Autodesk Inventor interface, you avoid the need to learn new software so you can see immediate benefits.

### Communicate and Manage Design Data

#### Vault Data Management

Autodesk Vault makes data management more efficient by organizing and protecting your design data from inadvertent changes. This easy-to-use data management tool makes work-in-process data more accessible and reusable, while avoiding the inherent versioning problems of sharing files among workgroups. Most importantly, Autodesk Vault is tightly integrated with Autodesk Inventor Professional, making data management easier than ever. For more information, visit [www.autodesk.com/vault](http://www.autodesk.com/vault).



## Learn Easily, Deploy Quickly

### Auto-Route Solution Cycling

Cut material costs by analyzing alternative routing options to meet your design goals. The Auto-Route Cycling tool will step through multiple valid solutions that connect two selected points, displaying solution priorities sequentially based on route length and number of segments.

### Place Fitting

Efficiently add fittings using automatic cutback and run completion features to prevent errors and manual interventions. Use the familiar Autodesk i-drop® functionality to drag fittings, valves, and other components into existing segments.

### Advanced Help System

Speed your transition to 3D with contextual help. The award-winning Design Support System (DSS) offers browser-based support and an electronic infrastructure for easy learning so you can get up to speed quickly.

## STRESS ANALYSIS

Add loads and constraints to an Autodesk Inventor part model and analyze the results.

### Create Quality Products the First Time Around

#### Evaluate Part Function

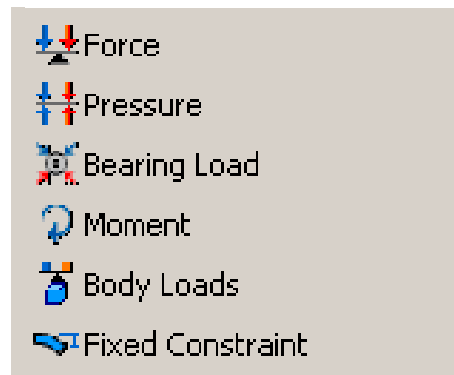
**New** Save time by removing the guesswork from part design. Examine how your parts perform in the real world. With Autodesk Inventor Professional you can visualize just how much your parts will deflect under realistic operating conditions.

#### Analyze Material Selection

**New** Stop overdesigning parts and start saving money by choosing the best possible material type for the task at hand. Using less material results in a lower cost per part and saves money downstream on shipping, material handling, and warehousing fees.

### Check Safety Factor

**New** Make design decisions based on analysis rather than intuition. Let the simulation assist you in building the optimal part. Visually identify trouble spots that fall below your safety factor requirements and develop alternative solutions for these areas.



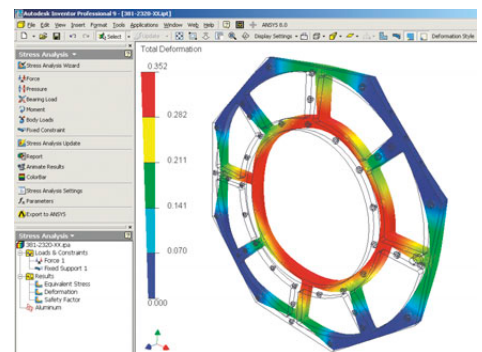
### Stress and Strain Analysis

**New** Create higher quality parts and experience fewer field failures when you perform Stress and Strain Analysis right in the Autodesk Inventor application. Embedded analysis types powered by ANSYS technology include Stress, Displacement, and Safety Factor. Based on user-defined loads and part geometry, Autodesk Inventor Professional will automatically create an FEA Mesh and solve for stress and displacement.



### Embedded Results Viewing

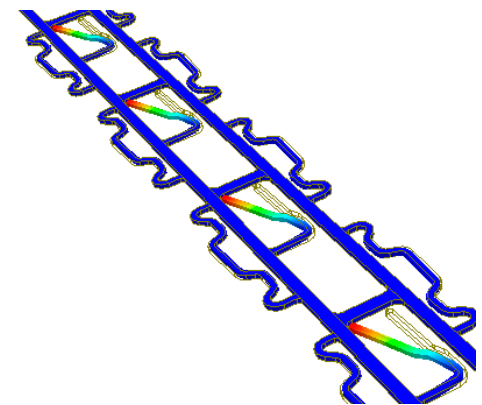
**New** Because you can view results without leaving the Autodesk Inventor environment, you can make modifications more quickly and execute additional simulations until you achieve the desired results.



### Communicate and Manage Design Data

#### Export FEA Data to ANSYS Design Space

**New** Use the analysis from Autodesk Inventor Professional directly in other ANSYS products, offering a foundation for further validation, engineering review, and advanced studies. This functionality accurately communicates load data to those performing more advanced simulations.





## Share Validation Results

**New** Quickly and easily share results by exporting bitmaps and creating reports.

## Learn and Deploy Quickly

### Easy to Use, Integrated Analysis

**New** Check part designs and explore the impact of design changes on the fly, without interrupting the design process by leaving the Autodesk Inventor application. The tight integration requires no CAD model translation, so this analysis functionality is easier to use than stand-alone solutions. Because you'll have access to functionality typically reserved for analysts, you can validate designs while you draw, making it easy to optimize your designs.

## IDF IMPORT

Automate the creation of printed circuit board geometry.

### Geometry for PCBs

Save time by importing printed circuit board (PCB) geometry in Intermediate Data Format (IDF) files directly into your Autodesk Inventor Professional model, establishing fit without creating a physical prototype.

### Learn More About Autodesk Inventor Series

Autodesk Inventor Professional is based on Autodesk Inventor Series, a comprehensive, integrated design solution for 2D and 3D design and documentation. It includes Autodesk Inventor software, AutoCAD® Mechanical for 2D drawing and detailing, and Autodesk Vault for data management. Now you no longer have to choose between 2D and 3D—Autodesk Inventor Series gives you the right tool for the job. To learn more, visit [www.autodesk.com/inventorseries](http://www.autodesk.com/inventorseries).

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111 McInnis Parkway  
San Rafael, CA 94903

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