

# Technical What's New

**Autodesk<sup>®</sup>  
Inventor<sup>®</sup>**

2011

Autodesk<sup>®</sup> Inventor<sup>®</sup>

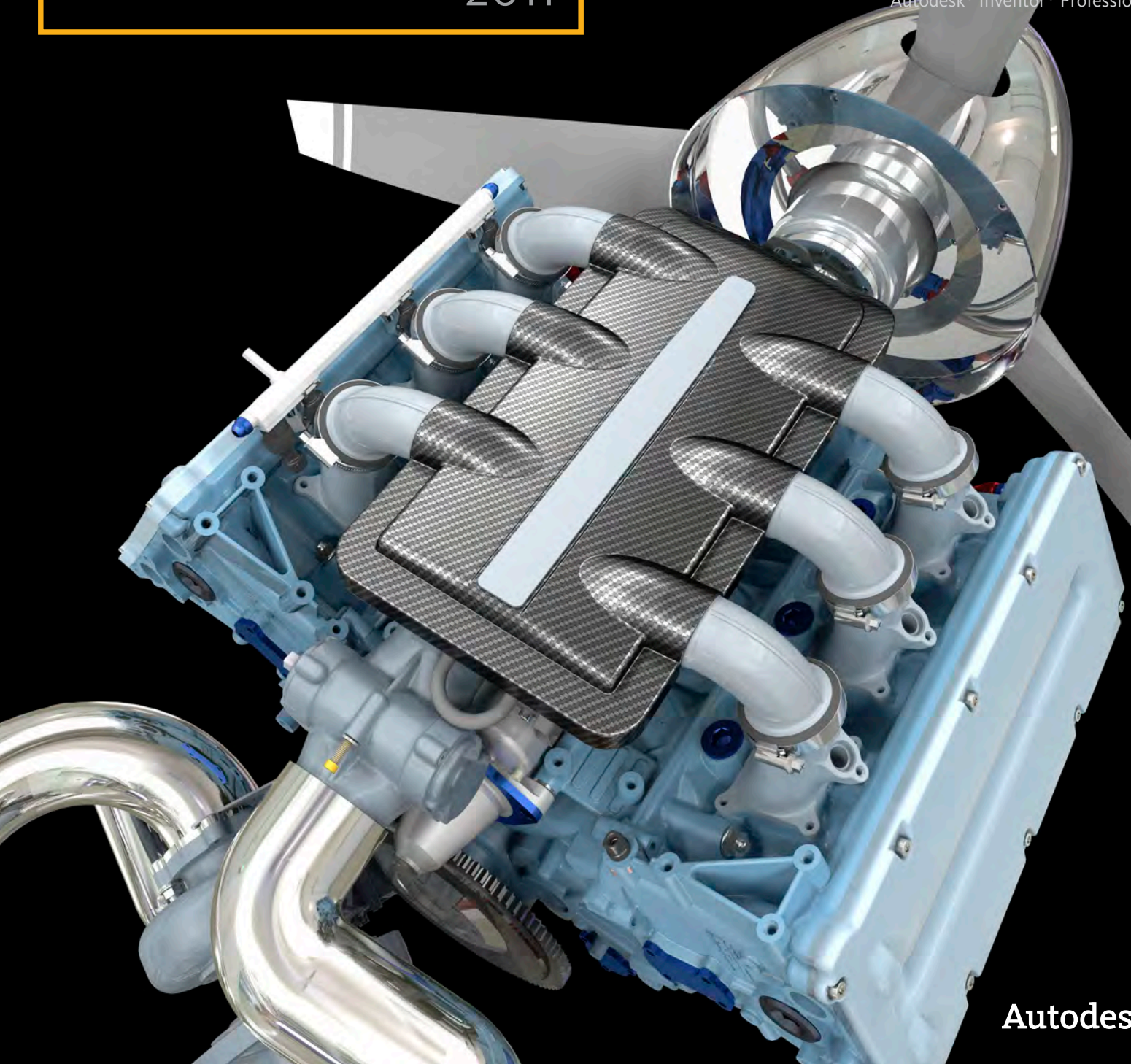
Autodesk<sup>®</sup> Inventor LT™

Autodesk<sup>®</sup> Inventor<sup>®</sup> Routed Systems

Autodesk<sup>®</sup> Inventor<sup>®</sup> Simulation

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**Autodesk**

# Technical What's New

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# Technical What's New

## Welcome to the Autodesk Inventor 2011 Software Product Line

The Autodesk® Inventor® 2011 software product line redefines “Ease-of-Use” with a revolutionary new design experience that offers significant benefits to engineers who need to design, visualize, and simulate their products.

### **Design It.**

Inventor 2011 introduces radically superior ways to design in 3D. Breakthroughs in both assembly design and part modeling usher in a new era of dramatically easier to use, easier to learn design tools.

### **Visualize it.**

Inventor 2011 provides state-of-the-art visualization capabilities to provide stunning representations of designs to improve design communication with partners in the design process.

### **Simulate it.**

The powerful simulation tools in Autodesk Inventor 2011 software have also been enhanced to make it easier for you to create and validate multiple design iterations.

Major areas of focus in this release include the following:

- New Design Methodologies
- Rules-based Design
- State-of-the-Art Visualization
- Interoperability and BIM Exchange
- Drawing and Productivity
- Simulation
- Tooling and Mold Design

Plus, Inventor 2011 includes a preview of ground-breaking new Digital Prototyping technology from Autodesk that will change the way you work with 3D mechanical design software. The Autodesk® Inventor® Fusion Technology Preview is innovative, new direct modeling technology that unites direct and parametric workflows within a single digital model.

Thank you for your continued support of Autodesk Inventor, and enjoy the new release!

*The Inventor Team*

# Technical What's New

## New Design Methodologies

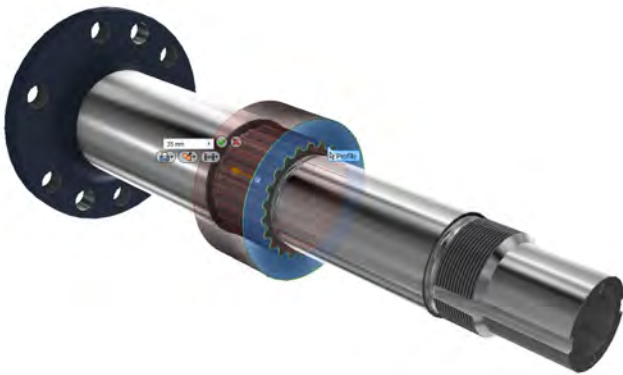
Inventor 2011 introduces radically superior ways to design in 3D. Breakthroughs in both assembly design and part modeling usher in a new era of dramatically easier to use, easier to learn design tools.

### Direct Manipulation Part Modeling

Inventor 2011 employs the principles of direct manipulation to make fundamental improvements to the mechanical design process. Direct manipulation offers an uninterrupted workflow that not only helps to accelerate design, but also fosters greater creativity.

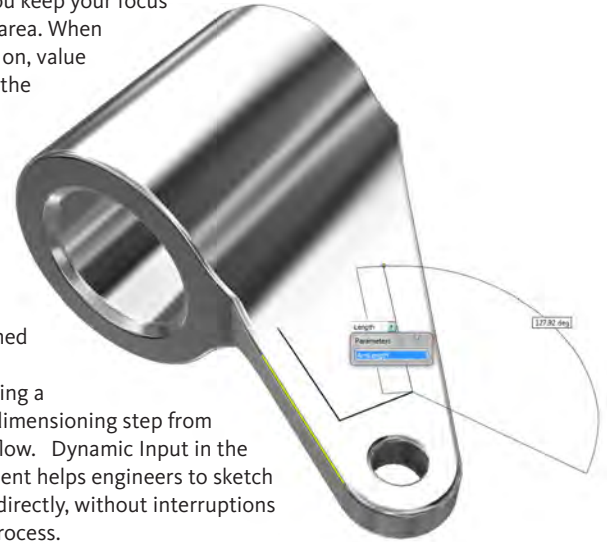
With direct manipulation, all of the input needed for a command (radius, angle, dimensions, and so on) can be controlled right at the point where you are directly affecting geometry. By optimizing the command interaction, direct manipulation allows you to focus on your design, rather than the software. With fewer distracting dialog boxes and less mouse travel, you can enjoy a faster, more intuitive design experience.

Direct manipulation also features dynamic previewing to help you to make better design decisions. When a command is invoked, the display of the model automatically updates to preview the outcome of the design modification. By providing an easy way to explore design alternatives through more accurate and interactive previewing, direct manipulation helps you understand clearly how the available command options can enhance your designs.



### Dynamic Input in the Sketch Environment

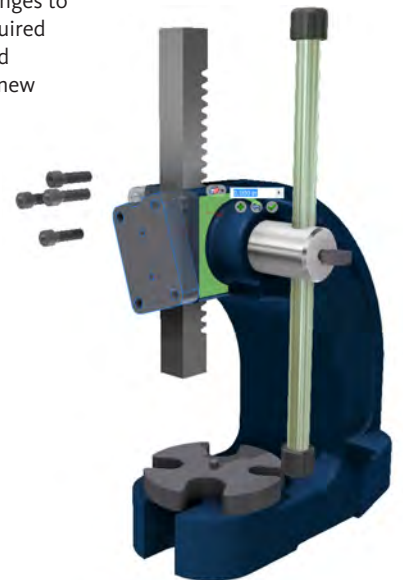
Inventor 2011 now offers dynamic input for the most commonly used sketch commands. Dynamic input in the Sketch environment provides a heads-up display (HUD) to help you keep your focus in the sketching area. When dynamic input is on, value input fields near the cursor display information that is dynamically updated as the cursor moves. The heads-up display allows you to create dimensioned geometry as you sketch—eliminating a whole separate dimensioning step from the sketch workflow. Dynamic Input in the Sketch Environment helps engineers to sketch more freely and directly, without interruptions to the creative process.



### Assemble Tool

Create assemblies in a snap! Extending the paradigm of Osnap pioneered in AutoCAD, Inventor 2011 introduces a dramatically simpler method of assembling components into a design. Inventor users can now easily 'snap' components together using the new Assemble tool. Simply select a geometric element on an incoming part, and drag the component around the screen. Inventor will automatically seek a compatible geometric element in the on-screen assembly and 'snap' the two pieces together.

Inventor 2011 also makes it easy to reposition components without having to manage assembly constraints, enabling you to quickly evaluate alternative assembly arrangements. If a user wishes to reposition components, the new assembly diagnostic tool automatically identifies the changes to Inventor constraints that will be required to allow the repositioning to succeed with the desired design intent. This new diagnostic tool provides guidance and assurance that the intended design dependencies will be maintained while different design concepts are explored.

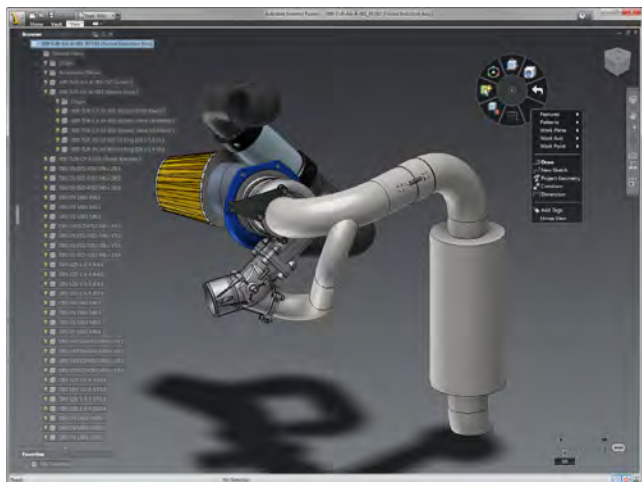


# Technical What's New

## Inventor Fusion Technology Preview

The Autodesk® Inventor® Fusion Technology Preview from Autodesk Labs is included in the box with Autodesk Inventor 2011.\*

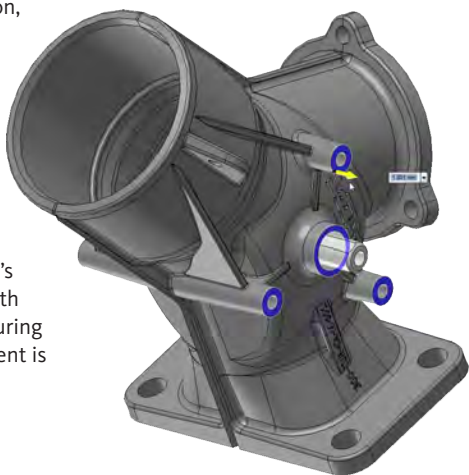
The Autodesk Inventor Fusion Technology Preview is innovative, new Digital Prototyping technology that's changing the way people work with 3D mechanical design software. Inventor Fusion is a technology preview intended to give our customers opportunity to provide feedback on possible future capabilities. Should you choose to use Inventor Fusion, please provide feedback to [labs.iv.fusion@autodesk.com](mailto:labs.iv.fusion@autodesk.com). For more information on Inventor Fusion and other exciting technologies, please visit [labs.autodesk.com](http://labs.autodesk.com).



## Unites Direct and Parametric Workflows

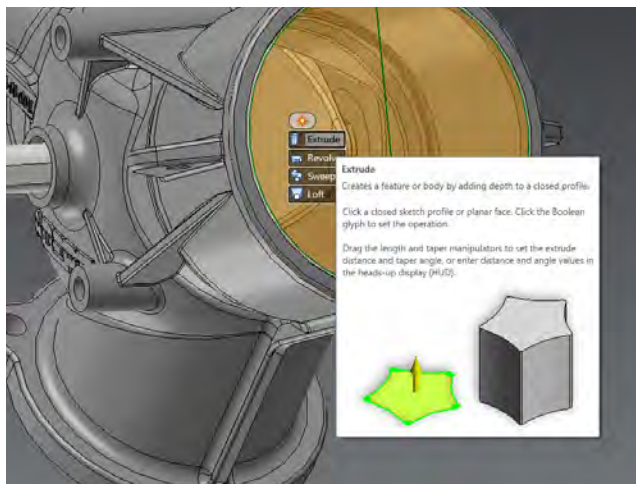
With the Inventor Fusion Technology Preview, both direct, history-free and parametric, history-based workflows are united. The unique fusion of capabilities enables you to adopt the modeling approach that is most appropriate for the task at hand.

- The freedom of direct modeling with the ability to exercise control over change
- Automatic creation, deletion, or modification of features necessary to accommodate changes
- Automatic update of a parametric model's feature history with each change, ensuring critical design intent is maintained



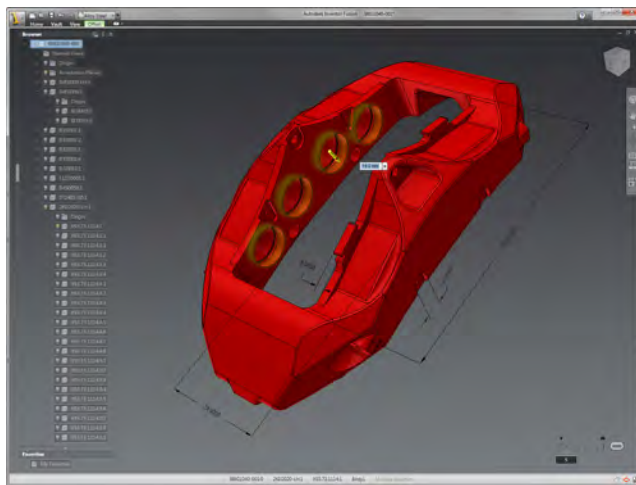
## Unrivaled Ease of Use

- Fast, easy selection tools for direct manipulation of your design models
- Heads-up sketching and modeling predict your actions based on design context
- Intuitive, graphics-based user interface keeps your focus on the screen center
- Advanced graphics technology for crystal clear visualization and stunning displays



## Rapid Design Changes without Limitations

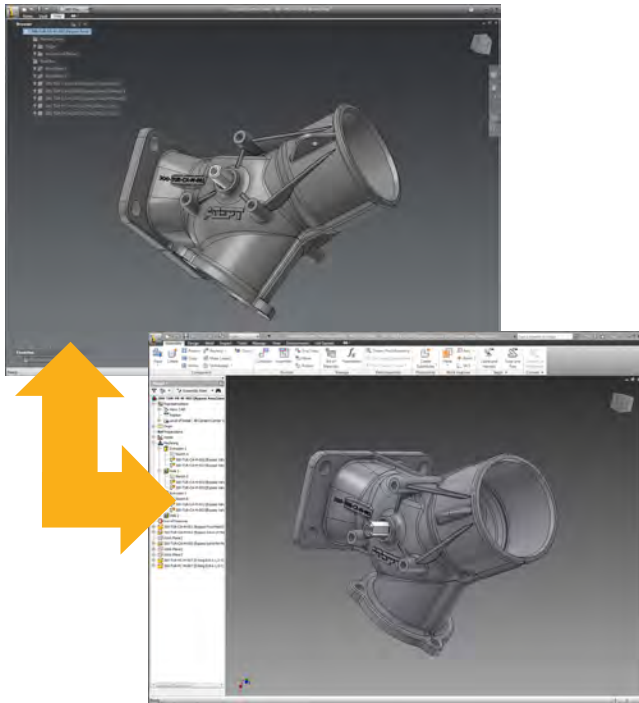
- Direct modeling when it's the right tool for the job
- Quickly make unique design changes and explore "what if" scenarios
- Easily express your design ideas irrespective of feature order, dependencies, or original CAD system



# Technical What's New

## Inventor Fusion Technology Interoperability

The Inventor Fusion Technology Preview is fully interoperable with Autodesk Inventor 2011. The integration of Inventor Fusion technology with Inventor gives users two base modeling environments to choose from. If Inventor Fusion technology is installed, importing a base body automatically launches Fusion, where the base solid can be edited in the Fusion environment. Once the Fusion editing session is ended and the Inventor environment is re-entered, the edited model is redisplayed in the Inventor graphics window showing any new or changed features.



The interoperability between Inventor 2011 and the Inventor Fusion Technology Preview enables you to convert the edits made in Fusion into Inventor parametric features. The Inventor Fusion Change Manager enables users to identify and manage any changes made to an Inventor part or assembly with Inventor Fusion Technology. As direct modeling and flexible history-free changes are made in Inventor Fusion Technology to your existing parametric Autodesk Inventor Data, important information about who, when, and why the change was made is recorded. You can then return to Autodesk Inventor and manage the changes. Individually review, accept, or deny each change, maintaining complete control over your design.

Inventor Fusion technology also makes it easy to exchange data with AutoCAD and other common 3D CAD systems. You are able to open Inventor Fusion technology designs in AutoCAD to easily create drawings and assemblies of your digital prototypes. Being able to utilize mixed data formats is one of the many user-friendly and intuitive benefits of Autodesk's Inventor Fusion Technology.

## Design Automation

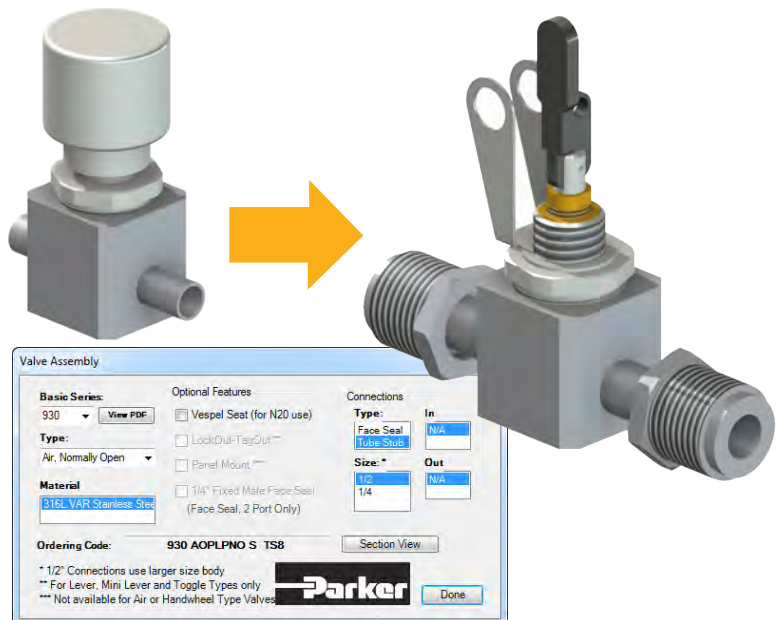
Autodesk Inventor 2011 features rules-based design and automation tools to accelerate design by automating common tasks, enabling engineers to focus on design intent rather than manually modeling geometry.

## iLogic

Inventor iLogic technology is now fully integrated into Inventor 2011. Inventor iLogic technology dramatically simplifies rules-based design for any Inventor user—even those with little or no programming experience. iLogic technology allows designers and engineers to capture and embed engineering and product knowledge directly into virtual models.

The Inventor iLogic rules wizards enable you to easily create “smart” parts and assemblies that define multiple product configurations and automatically update in realtime based on logical relationships between design parameters. Whereas parametric design allows the capturing of design intent, Inventor iLogic allows one to capture design intelligence to define assembly behaviors. iLogic lets users add knowledge to existing designs with full support for iParts and iAssemblies. Rules can be added to any Inventor part or assembly model, transforming it into a reusable knowledge asset.

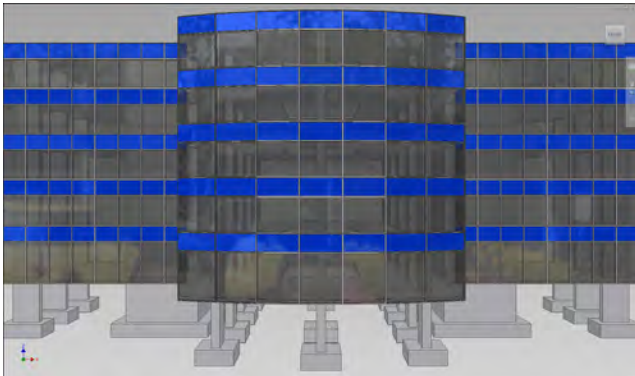
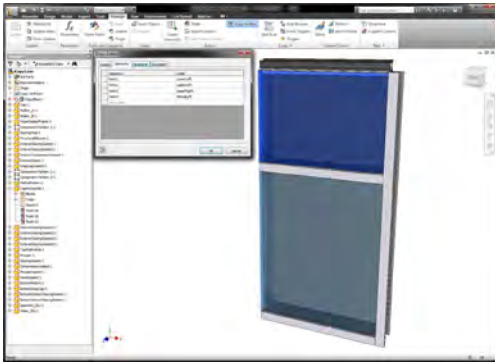
With Inventor iLogic, rules are created graphically from native Inventor parameters and embedded directly into the Inventor data model. By making rules-based design intuitive and accessible, iLogic technology can help all Inventor users define complex product configurations, increase engineering productivity, and optimize designs to meet their required design goals.



# Technical What's New

## iCopy

The new iCopy feature in Inventor 2011 enables you to easily customize commonly used assemblies by automating the process of copying and positioning similar components in the assembly. iCopy automatically resizes multiple copies of standard elements to fit within a design by referencing a few key constraints, such as connection points and paths. iCopy combines skeletal modeling and adaptability to allow the subassembly to change shape to fit its position in the model. Instead of painstakingly adjusting the size of each copied element, use iCopy to properly resize and insert each copied element into the assembly. iCopy saves time and is especially effective for architectural engineers who need to explore multiple design iterations of structural elements quickly.



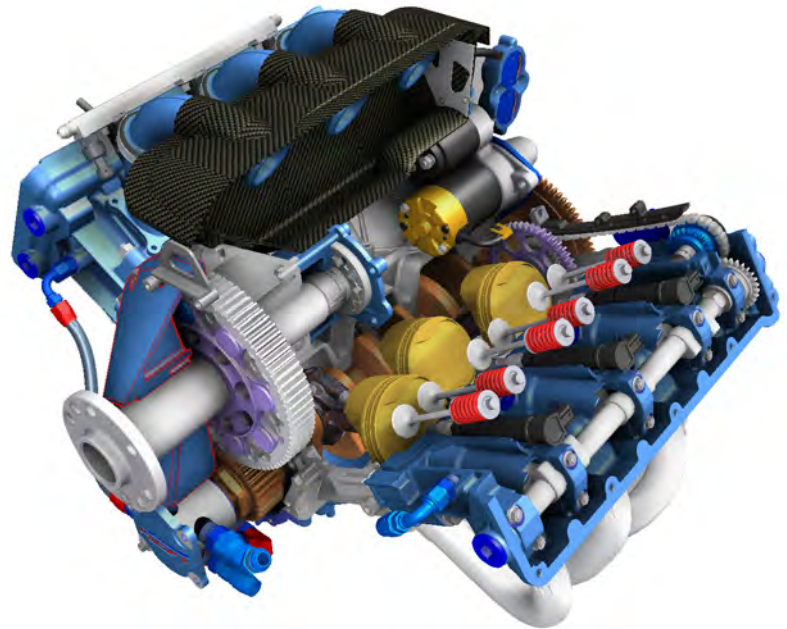
## State-of-the-Art Visualization

Inventor 2011 provides state-of-the-art visualization capabilities to provide stunning representations of designs to improve design communication with partners in the design process.

## Realistic rendering all the time

With dramatically enhanced visualization, Inventor 2011 helps you better conceptualize designs and communicate with others. The visual display now features significantly improved shading, lighting, and material properties in the default work environment, giving you a more realistic representation of your design at all times.

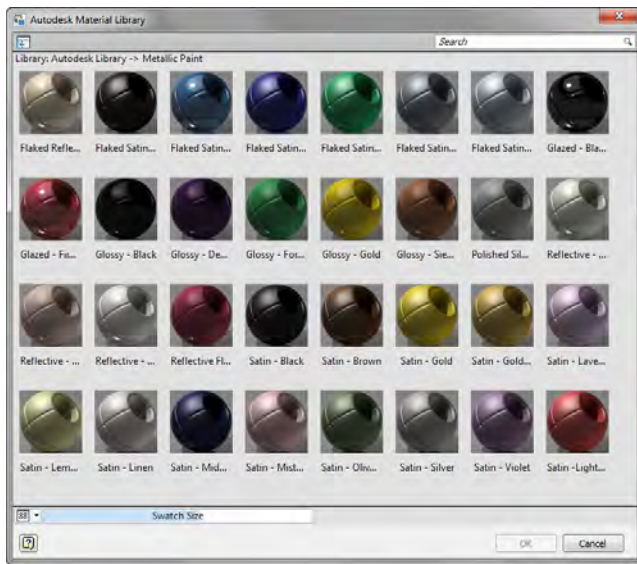
Inventor 2011 helps to evaluate and share designs by allowing engineers to optimize the display style of their 3D models to suit the particular task. In addition to the default rendering mode, Inventor 2011 provides one-button access to a variety of preset visual representations of your designs, including wireframe, shaded surfaces, hidden line removal, photorealistic, and illustration modes. In addition to the various preset displays, Inventor also allows you to define your own custom display modes. High-performance graphics enhancements make changing between display modes faster.



# Technical What's New

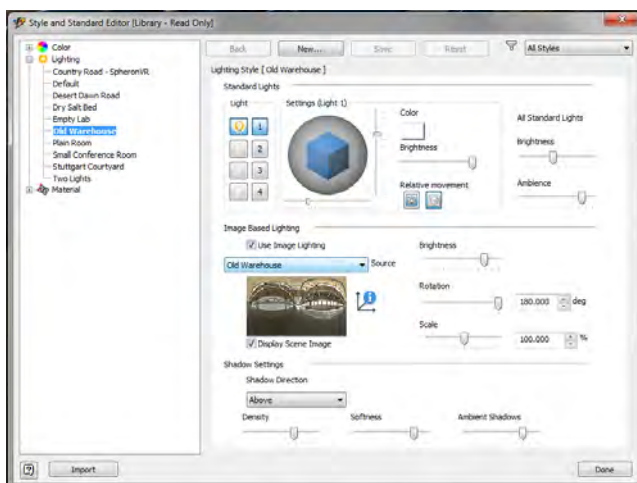
## High-Quality Visual Materials

The library of visual materials in Inventor 2011 has been substantially enlarged so that users can display even more accurate and stunning representations of their products. Higher resolution textures for downstream rendering means that designers can share higher quality images with management and customers.



## Improved Lighting Control

To further improve the visual experience, Inventor 2011 provides enhanced controls for lighting and lighting styles, giving you the ability to highlight specific aspects of your designs. Inventor 2011 also includes a variety of background environments with image-based lighting schemes, making it easy to create photo-realistic scenes of your final product in actual environments.



## Visual Fidelity across Products

Because of new technology introduced in Inventor 2011, visual and material designations made in Inventor will carry forward to other Autodesk applications. In particular, lighting and material selections made in Inventor will transfer seamlessly to Autodesk® Showcase and Autodesk® 3ds Max® Design for further development of marketing imagery. Visual fidelity will also be maintained when transferring Inventor data to Autodesk building design products, including Revit® and AutoCAD® products, helping building fabricators to communicate design aesthetics with architects, contractors, and customers.

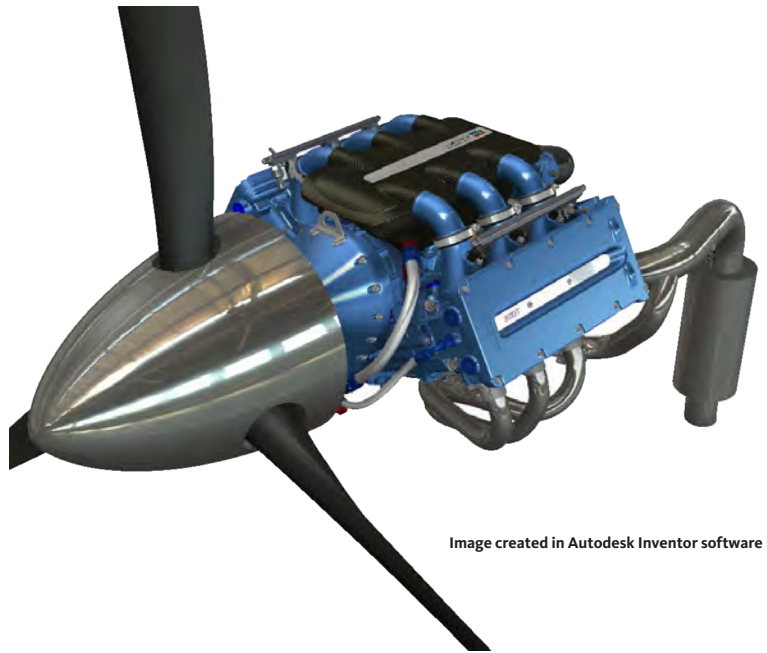


Image created in Autodesk Inventor software

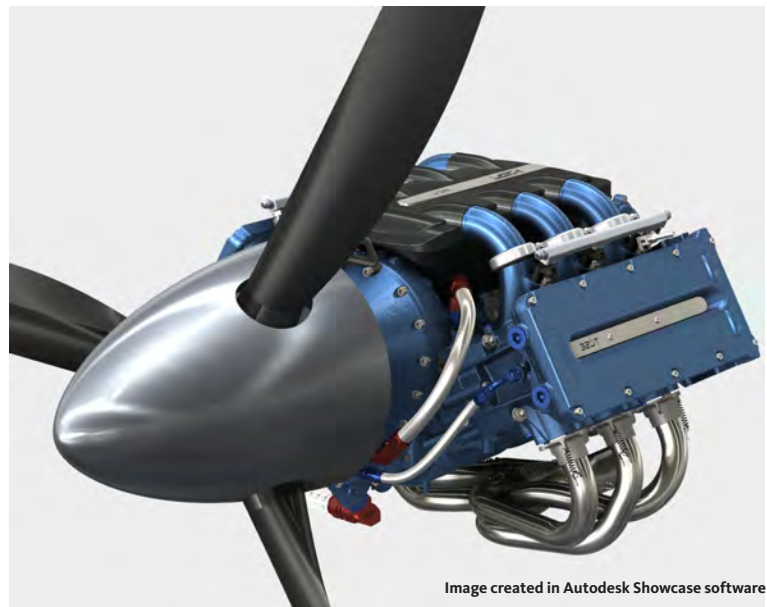


Image created in Autodesk Showcase software

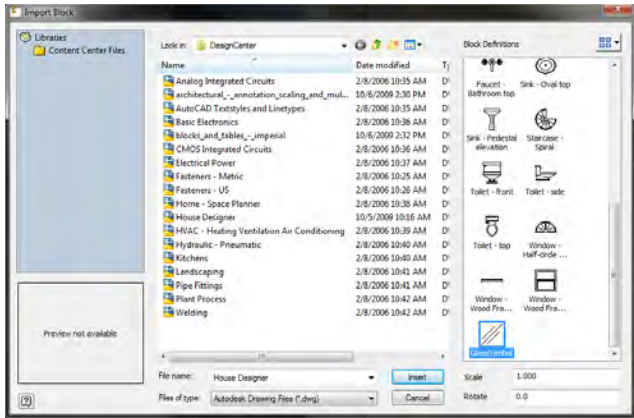
# Technical What's New

## Drawing and Productivity Enhancements

Drawings are an essential part of the design and manufacturing processes of almost any product. The Inventor 2011 drawing environment is packed with productivity enhancements and tools to quickly generate more consistent drawings. Anybody creating and editing drawings in Inventor will find tools that can dramatically increase their productivity.

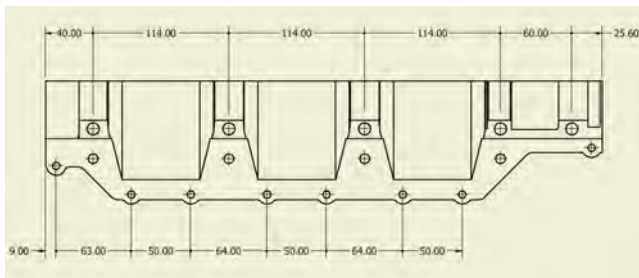
## DWG Block Browser

Save time reusing data from AutoCAD software. Browse for various blocks in DWG™ files and precisely insert them into an Inventor drawing without ever needing to open the AutoCAD drawing.



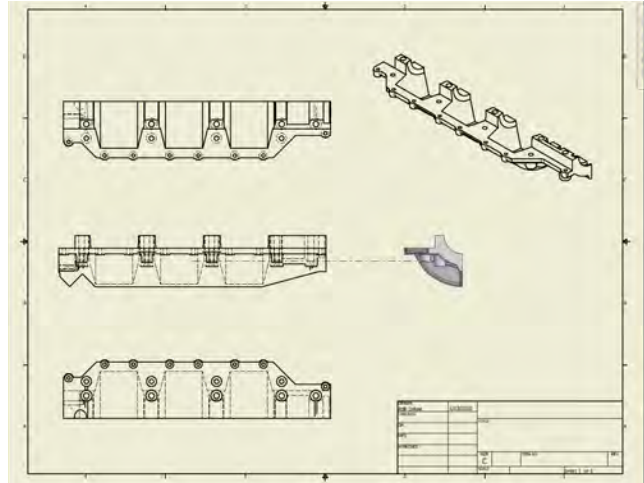
## Chain Dimensioning

Create chain dimensions quickly and easily by placing or creating a base dimension, and then selecting individual points from the drawing view to insert and align each additional dimension to the chain dimension.



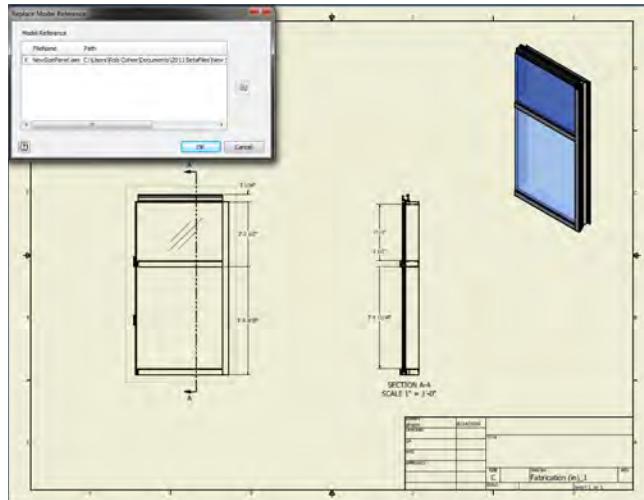
## Multi-View Create

Easily create multiple views simultaneously, rather than one at a time. Specify several views to be created in a single command, reducing the number of steps required to place drawing views.



## Replace Reference Model

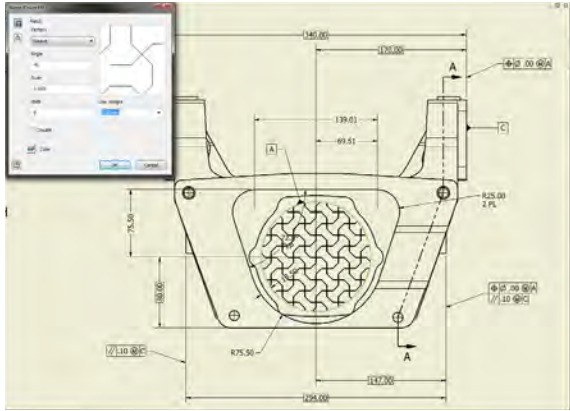
Dramatically speed the production of drawings of similar parts by replacing the base model in the drawing, allowing Inventor to recreate all views for the new model.



# Technical What's New

## Hatch Patterns

With enhancements such as automatically breaking hatch patterns around text, Inventor 2011 makes working with hatching easier than ever before. Inventor 2011 also allows you to import your custom hatch patterns from AutoCAD, helping you to maintain consistency in your drawings.



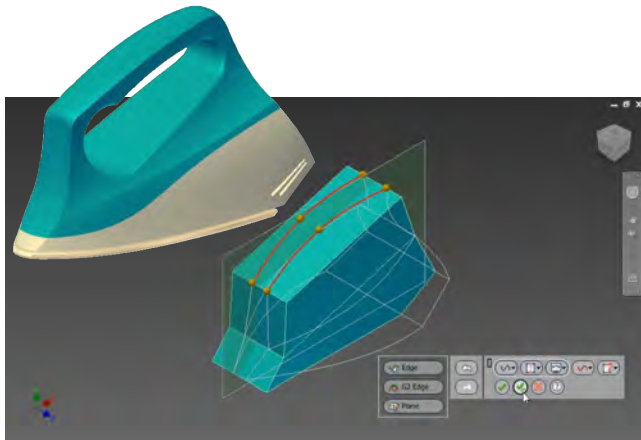
## Interoperability

### Alias-Inventor Interoperability

To execute design projects that require shapely, flowing forms, design teams have taken advantage of the CAD interoperability between Autodesk® Alias® Design software and Inventor for fast, high-quality data exchange between industrial designers and mechanical engineers. With the new Autodesk® Alias® Design for Inventor® 2011, Autodesk takes this interoperability to a whole new level.

Autodesk Alias Design 2011 software now includes Alias Design for Inventor, an additional application that works directly within Inventor, providing free-form 3D shape modeling workflows. It can be installed directly in Inventor and is fully integrated.

The free-form 3D shape modeling with Alias Design for Inventor enables a new level of integration between design, engineering and manufacturing. Alias Design for Inventor features intuitive workflows that enable engineers to easily explore the shape, form, and aesthetics of their designs.



## CATIA Translators

Autodesk Inventor 2011 software simplifies interdisciplinary collaboration across many industries and products. In addition to CATIA V5 files, you can now open, import, place, or drag and drop CATIA V4 models into Inventor files. Associativity is not maintained, but the imported model behaves as if it were created with Inventor. Select from various import options to achieve the appropriate model characteristics.

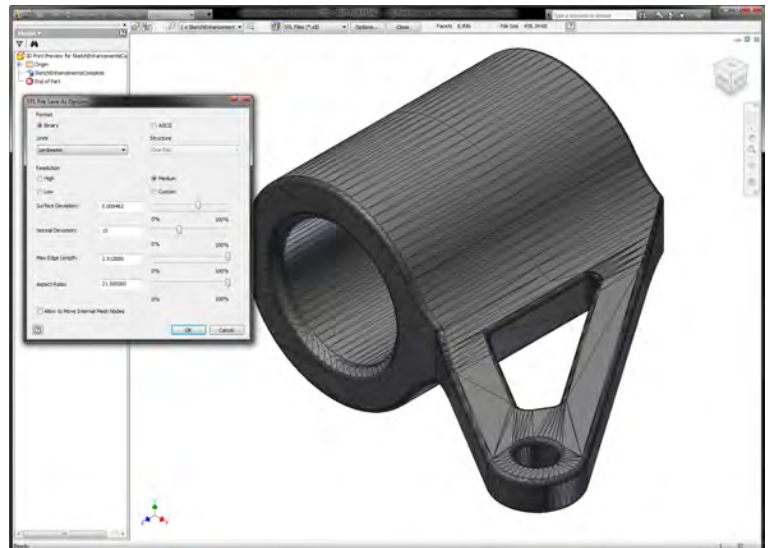
With the ability to read CATIA V4 and CRG formats, Inventor users will now be able to leverage even more models that were created with CATIA. Additionally, enhancements made to the existing built-in translators offer improved importing and exporting of the many file formats already available.

## 3D Printing

When it comes time to print a 3D model, Inventor now lets you preview the final outcome before ever printing the model. The 3D Print Preview displays an accurate representation of the printed model, helping to ensure that you receive the quality of 3D printing you expect.

In this preview environment, users can see the triangular mesh, including the number of facets in the mesh and the size of the file that will be sent to the 3D printer or saved as a file. Now assemblies can be output as a single file or as multiple files (one file per part instance). Users can choose the output units, and STL files may be written in either the binary or ASCII STL format.

Autodesk Inventor users can now take advantage of a new 3D print service from directly within the Inventor software. Simply select "Print to 3D Service" from the Inventor menu and the 3D printed model will be shipped directly to you. (Additional printing and shipping fees apply.)



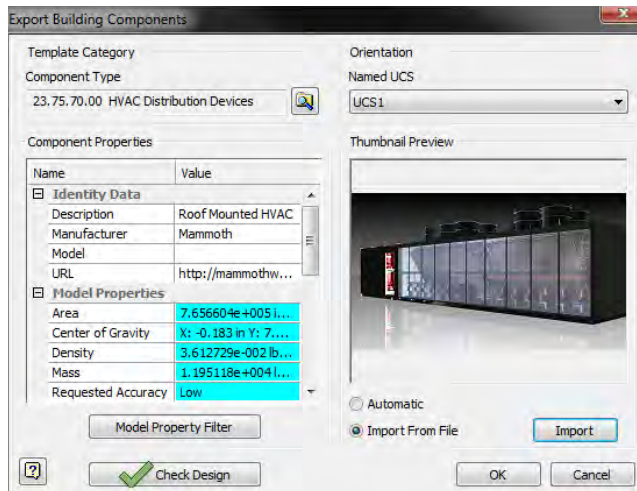
# Technical What's New

## BIM Interoperability

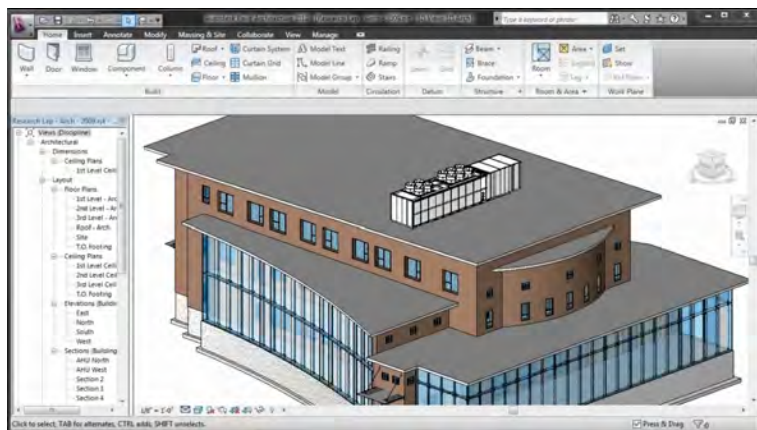
In addition to new features such as the DWG Block Editor and iCopy, which are applicable to both general design as well as Building Information Modeling (BIM), Inventor 2011 also includes key enhancements designed specifically for mechanical engineers and fabricators working in collaboration with architects, builders, and contractors.

## BIM Exchange

Enhancements to the BIM Exchange functionality in Inventor 2011 have significantly improved data sharing between Inventor and Revit or AutoCAD for architecture. To maintain consistency between Autodesk products, models published from Inventor now maintain the same visual fidelity of materials when imported into Revit and AutoCAD for architecture.

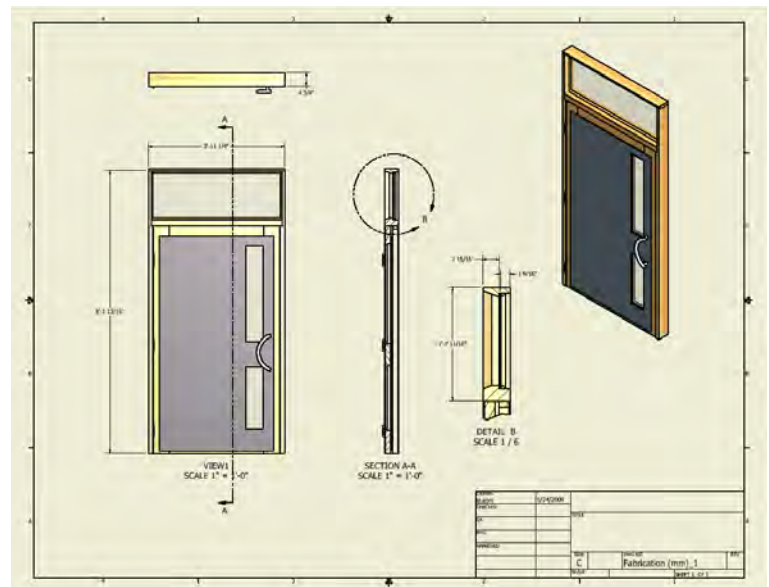


In addition, the BIM Exchange categories have been expanded to include items like doors, windows, and lights. The categories list is also much easier to navigate in Inventor 2011 with the new category search tool for publishing components from BIM Exchange.



## Architectural View Scales

When placing drawing views, you can now display fractional view scales such as 1/4" = 1'-0" to be associative to the drawing view. If the drawing scale changes, the view scale label dynamically updates to maintain the correct fractional view scale.



# Technical What's New

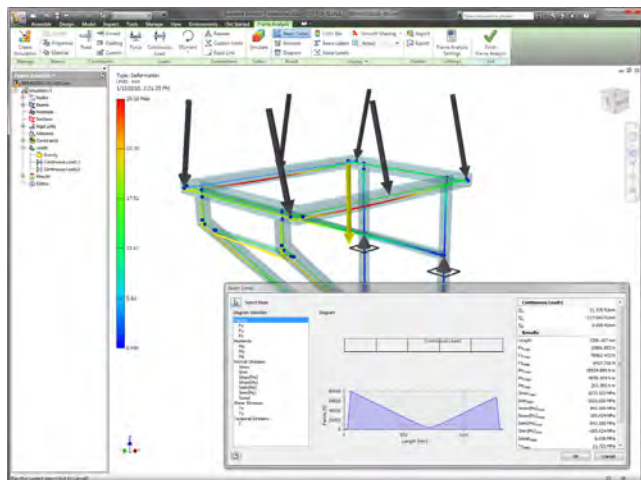
## Simulation

The powerful simulation tools in Autodesk Inventor 2011 software have been enhanced to make it easier for you to create and validate multiple design iterations. Simulation scenario setups have been streamlined, and the visual feedback and simulation results are now clearer and more customizable.

### Frame Analysis

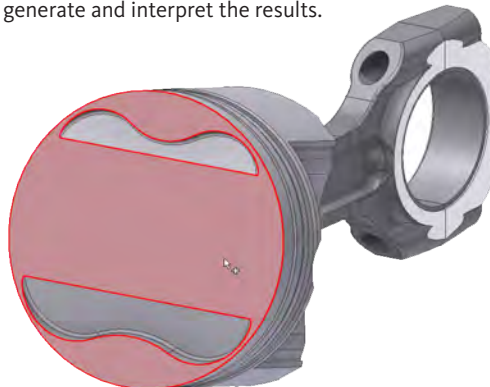
Simulate the performance of load bearing frame models quickly and efficiently with Frame Analysis. Fully integrated with Frame Generator, Frame Analysis offers a complete end-to-end Digital Prototyping environment. Users can sketch out their framed structure, create the detailed design with frame members from our extensive library, and then quickly simulate the response of the frames to gravity and other loads in an easy-to-use environment that automatically brings over the material properties and member cross sections from Frame Generator.

Using Frame Analysis, you can set up and run a static stress or modal analysis of your frame structure. The assembly is automatically converted into idealized nodes and beams. You can define mechanical properties of beams and apply loads and constraints to your frame to simulate your test case. Once the criteria are entered, you can run the simulation and view the behavior relative to the conditions you defined. Inventor 2011 features enhancements to simulation visualization, including the ability to record animations of displacement and stress results over time. You can produce video output of the displacement animation. After running the analysis, you can take advantage of the report generation tools to present your results and embed graphics and animation in your reports.



### Simulation Guide

Inventor 2011 makes it easier than ever for everyone to take full advantage of the many powerful simulation tools in Inventor. The Simulation Guide walks you through the steps required to define the best scenario to represent the particular loads or interactions. The new Simulation Guide makes simulation accessible even to new and occasional users by helping them to set up loads, constraints, and contacts as well as generate and interpret the results.

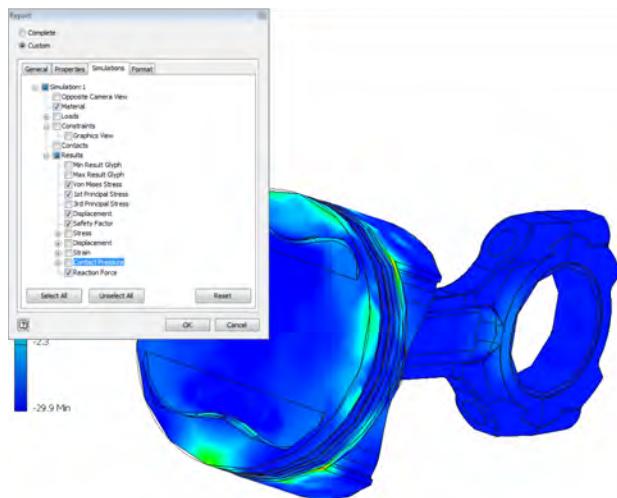


### Materials Assignment for Simulation

Save time by easily selecting several components in the materials browser using the Shift or Ctrl button to simultaneously change the material properties. In addition, all the selected components are highlighted in the graphical display as well as the stress analysis browser to help you identify all the components affected by the material property changes.

### Editable Simulation Reports

Output simulation results in a single file (.mht or .rtf) that is editable in the most commonly used word processing software. Easily modify and customize the reports as needed. The single file also significantly streamlines the management of simulation reports in data management systems.



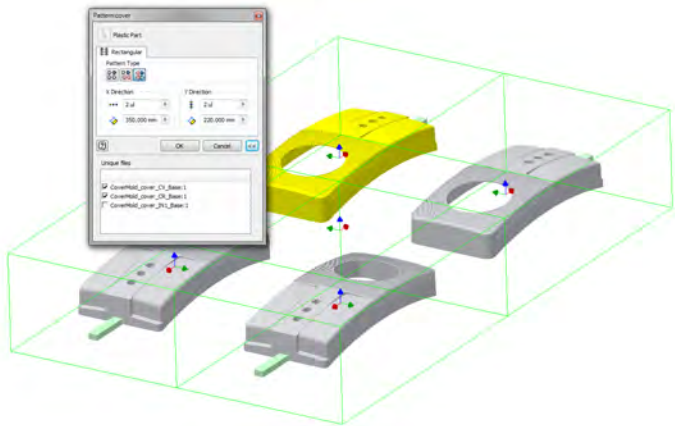
# Technical What's New

## Tooling

The tooling functionality introduced into the Inventor product line last year has been significantly enhanced and improved. Key workflow areas have been optimized to increase overall performance and capacity by over 50 percent when working with mold assemblies.

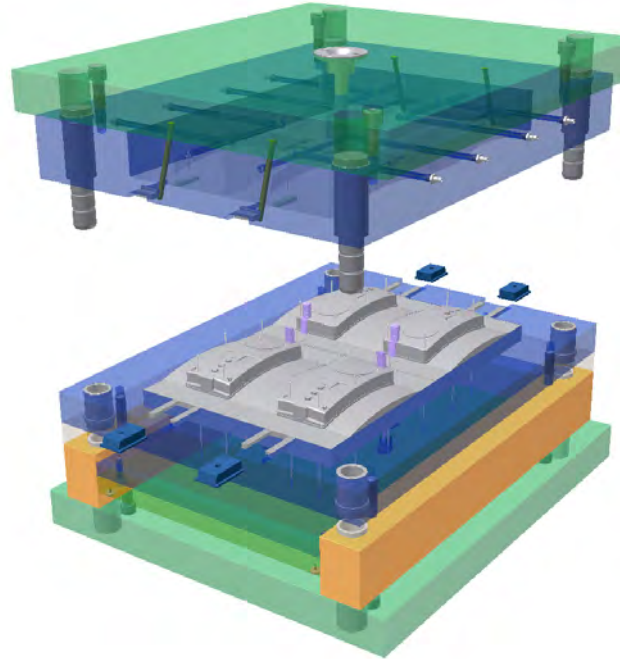
### Unique Instance Support

Inventor 2011 supports working with unique core/cavity, insert, and core pin instances in pattern. This allows for instance-specific detailing of mold aspects, such as gates, runners, and cooling channels, helping engineers to create more realistic patterns.



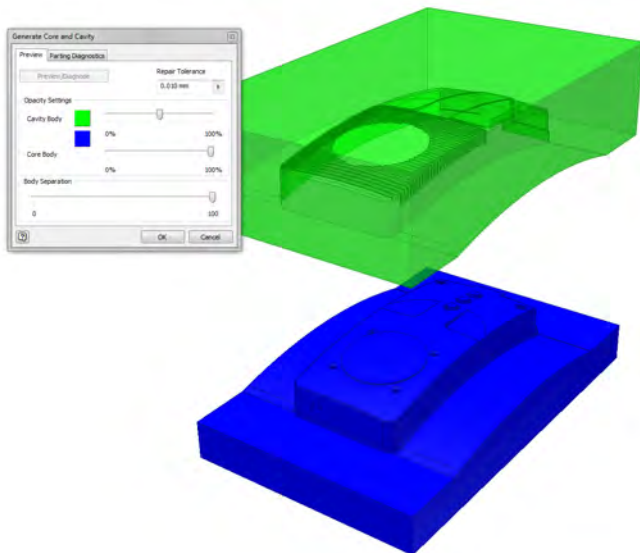
### Dynamic Simulation of Mold Assemblies

With Inventor 2011, you can now dynamically simulate the motion of your mold base assembly to easily examine the mold base components for clearance and interference. Inventor allows you to quickly evaluate the range of motion by automatically incorporating kinematic constraints and pre-defined positional representations for the mold base assembly.



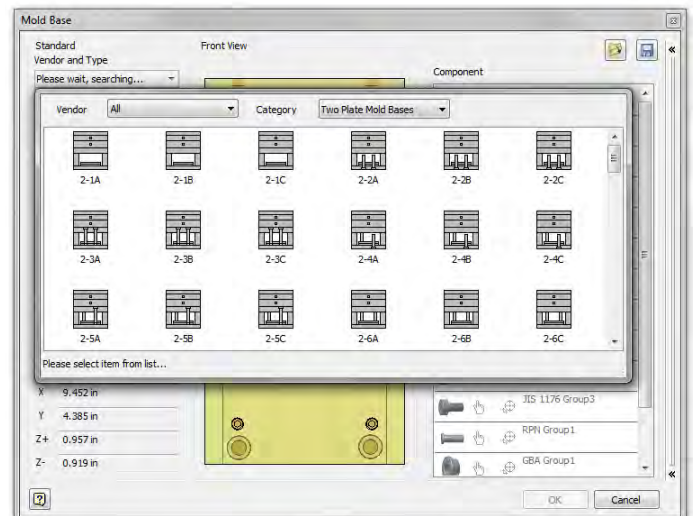
### Core/Cavity Creation Robustness

Inventor 2011 introduces mold-specific functionality to increase the robustness of core/cavity creation with context-sensitive error checking and reporting. You will be able to automatically generate the core/cavity for a broader range of parts, whether native Inventor or imported files.



### Enhanced Mold Base and Component Library Search

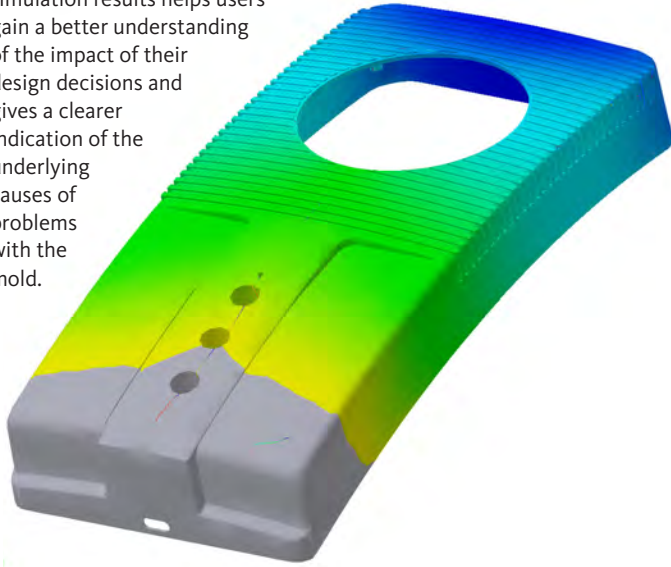
The mold base and component library have been enhanced in Inventor 2011 to make it easier to find exactly the part you need. With the ability to filter content by subcategory, finding components is significantly faster than before.



# Technical What's New

## Overlay Moldflow Results

Inventor 2011 gives you the ability to graphically display air traps and weldlines overlaid on the results from your Moldflow analyses. Viewing air trap and weldline indicators directly in conjunction with simulation results helps users gain a better understanding of the impact of their design decisions and gives a clearer indication of the underlying causes of problems with the mold.



## Stay Up to Date

Autodesk gives you more. Gain access to technical expertise, utilize training and support programs direct from Autodesk, stay up to date with the latest product releases, and give us your feedback. Not only does Autodesk want to help you use Autodesk Inventor more effectively but also make sure Autodesk Inventor is working effectively for you.

## Subscription

Autodesk® Subscription gives you immediate access to software upgrades and exclusive access to service and support benefits designed to help you get the most out of your Autodesk software. Learn more at [www.autodesk.com/subscription](http://www.autodesk.com/subscription).

## Product Updates

If you experience an issue with Autodesk Inventor 2011 that has already been solved in a service pack or hotfix, a dialog box appears when you submit the problem to Autodesk, enabling you to immediately install the new service pack or hotfix.

## Autodesk Learning and Education

From instructor-led or self-paced classes to online training or education resources, Autodesk offers learning solutions to fit your needs. Get expert guidance at an Autodesk Authorized Training Center (ATC®) site, access learning tools online or at your local bookstore, and validate your experience with Autodesk certifications. Learn more at [www.autodesk.com/learning](http://www.autodesk.com/learning).

## Feedback

Autodesk Inventor customers can provide feedback to the Autodesk Inventor development team through several different avenues. For example:

- Provide tips or join newsgroups at [www.autodesk.com/inventor](http://www.autodesk.com/inventor)
- Keep up-to-date on what's happening in your industry, stay in touch with other industry professionals, and take advantage of a host of online resources at the Manufacturing Community Portal at [www.mfgcommunity.autodesk.com](http://www.mfgcommunity.autodesk.com)
- Talk with your Autodesk Authorized Reseller and support staff

Your input is crucial to our success and we look forward to receiving your suggestions.

## Conclusion

We thank you for your continued support of the Autodesk Inventor family of products and hope you feel we are listening to your needs. We added the new and enhanced functionality to Autodesk Inventor 2011 to help make you more productive, make your company more competitive, and return true value to your bottom line.

# Autodesk® Inventor® Product Line: Key New Features

Feature	Inventor LT 2011	Inventor 2011	Inventor Routed Systems 2011	Inventor Tooling 2011	Inventor Simulation 2011	Inventor Professional 2011
<b>New Design Methodologies</b>						
Direct Manipulation	X	X	X	X	X	X
Dynamic Input for Sketching	X	X	X	X	X	X
Assemble Tool		X	X	X	X	X
<b>Rules-based Design</b>						
iLogic Technology		X	X	X	X	X
iCopy Feature		X	X	X	X	X
<b>State-of-the-Art Visualization</b>						
Realistic Rendering	X	X	X	X	X	X
High-Quality Visual Materials	X	X	X	X	X	X
Improved Lighting Control		X	X	X	X	X
Visual Fidelity across Products	X	X	X	X	X	X
<b>Interoperability</b>						
Alias-Inventor Interoperability		X	X	X	X	X
CATIA Translators	X	X	X	X	X	X
3D Printing Enhancements	X	X	X	X	X	X
BIM Exchange Enhancements	X	X	X	X	X	X
Architectural View Scales	X	X	X	X	X	X
<b>Drawing and Productivity</b>						
DWG Block Browser	X	X	X	X	X	X
Chain Dimensioning	X	X	X	X	X	X
Multi-View Create	X	X	X	X	X	X
Replace Reference Model	X	X	X	X	X	X
Hatch Patterns	X	X	X	X	X	X
<b>Simulation</b>						
Frame Analysis					X	X
Simulation Guide					X	X
Materials Assignment for Simulation					X	X
Editable Simulation Reports					X	X
<b>Tooling and Mold Design</b>						
Unique Instance Support				X		X
Core/Cavity Creation Robustness				X		X
Dynamic Simulation of Mold Assemblies				X		X
Enhanced Mold Base and Component Library Search				X		X