

Pro/ENGINEER Wildfire Assembly Overview

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Pro/ENGINEER Wildfire Advanced Assembly extends the power of Pro/ENGINEER Foundation Advantage to manage distributed development, even on a global scale, of complex products. It also facilitates and automates the exploration of product assembly variations making sure you leave no rock unturned. Additionally, you can add intelligence to your design assembly so it reacts correctly in any situation... so you don't have to.

Distributed Development of a Complex Product

Whether it's across the hall or the globe, developing a complex product with a distributed team is challenging to say the least. Pro/ENGINEER Wildfire Advanced Assembly provides a precise set of tools used in a proven process to accomplish exactly that.

• Clearly Defining and Communicating Design Intent

Just like every book has a table of contents, every complicated design needs to have a clearly defined source of design intent. It provides structure to the development of the product as well as a means of initiating global design change later. Pro/ENGINEER Wildfire Advanced Assembly provides the tools to create skeleton models that accomplished this precisely with sketch outlines, keep in and out volumes, zones and interfaces. In the end, it's easy for team members see what needs to be done.

• Distribution and Communication of Design Intent Once the design intent is defined, team members want and need to work on only what's relevant to their task. Pro/ENGINEER Wildfire Advanced Assembly let's them define their focus by copying relevant geometry or using published geometry in their relevant subsystem.

Controlling Inter-Dependencies

The ability to tie features together has resulted in huge benefits to react to change intelligently. However, with a distributed team developing a complex product, high numbers of unwanted relationships can result in inflexible designs prohibiting change and reuse. Pro/ENGINEER Wildfire Advanced Assembly provides tools to only allow users to create desired interdependencies and to track the progression of the design. In the end, it results in a complex product that is flexible and reusable.

Leave no rock unturned

A heavy contributor to innovation is iteration. Sometimes those iterations are variations in sizes of components and sometimes it trying out completely different components or assemblies. Pro/ENGINEER Wildfire Advanced Assembly extends the power of Pro/ENGINEER Foundation Advantage to create these variations quickly and easily.

• Families of Assembly Designs

When all you need is to vary is assembly dimensions or switch out components, there's no need to create entirely new assemblies. All you have to do is define what is different from the original. You can switch out family instances of component family tables or subassembly family tables, or even exclude them. Automation takes care of the rest.

Interchange Parts and Assemblies You can relate independent, functionally equivalent components, so they can be easily switched in an Assembly. Furthermore, you can create simplified exchange members. These can be substituted into a design to simply the display while retaining accurate mass property information.

Raising the IQ of your Design

If there is one truism in design, it's the fact that change is constant. The better you can deal with it, the faster and easier it is to complete you designs. Pro/ENGINEER Wildfire Advanced



Assembly lets you add logic to your model to automatically size components or assemblies based on calculations or simply user input. Furthermore, you can have this logic automatically switch out components or subassemblies for Family Table instances or Interchange instances automatically.

How to put it together or take it apart

The process planning functionality widely disseminates process information throughout the engineering and manufacturing organizations. It ensures clear communication of assembly procedures through either traditional process drawings or web-viewable process plans.

Easily Create Assembly Process Sequences

Working with intuitive tools, users readily define assembly process steps. Drag and drop techniques, exploded views and jogged explode offset lines provide a clear, complete and accurate representation of each process step.

Create Alternate Bill of Materials

Users can create BOM's to reflect only those components assembled up to a particular process step (manufactured BOM's) or to regroup design components based on how they are assembled during the assembly process (fabrication BOM's)

See Descriptions below to understand what Functionality is included with Foundation Advantage and Advanced Assembly Extension (AAX)

Pro/ENGINEER Wildfire Assembly Functionality at a Glance

Pro/ENGINEER Assembly Critical Capabilities	Foundation Advantage	AAX Advanced Assembly Extension
Component Assemble	•	
Drag & Drop Component Placement *New*	•	
Component Interfaces *New*	•	
Component Package	•	
Component Operations Delete, Suppress, Redefine, Reroute, Reorder, Copy, Group	•	
Component Repeat	•	
Assembly Features	•	
Family Tables	•	
Surface Copy Between Parts Basic Top Down Design Capability	•	
Explode Views w/Offset Lines	•	
Assembly Merge & Cutout Features Basic Inheritance Feature Capability	•	
External Reference Creation	•	
Assembly Mass Properties	•	
Interference Checks (Pairs/Global)	•	
Pipe Features in Assembly	•	
Mirrored Parts (Indep/Depend)	•	
Mirrored Sub Assemblies (Dependent)	•	
Restructure Components	•	
Assembly Level Cross Sections	•	
View Manager *New*	•	
Mechanism Design (MDX)	•	
Design Animation (DAO)	•	
Relations	•	
Flexible Components *New*	•	
Simplified Reps (including On Demand)	APX*	
External Simplified Representations *New*	APX*	
Envelope Parts	APX*	
Zones	APX*	
Patented Shrinkwrap Associative and Non-Associative	● APX*	
Lightweight Components *New*	APX*	
Bulk Items	•	
Component Visibility/Display	•	
Replace Component By Family Table	•	
Replace Component Manually	•	
Replace Component by Reference Model	•	
Replace Component by Interchange Assembly		•
Replace Component by Layout		•
Inheritance Features		•

Pro/ENGINEER Wildfire Assembly Functionality at a Glance (cont.)

Pro/ENGINEER Assembly Critical Capabilities	Foundation Advantage	AAX Advanced Assembly Extension
Reference Scope Control &		•
Global Ref Viewer & Ref Graph		•
Layouts: Create, open, edit		•
Skeleton Models		•
Data Sharing Features:		
Publish, Copy & External Copy Geom		•
Assembly Pro/PROGRAM		•
Assembly UDF Library		•
External (from Other Model) Merge & Cutouts		•
Create Unplaced Components		•
Custom Regeneration		•
Assembly Process Planning		•
Web Publishing of Assembly Process Plans		•

*APX (Advanced Performance Extension) is no longer available.

All APX functionality is now included in Foundation Advantage



Pro/ENGINEER Advanced Assembly Extension (AAX):

AAX provides the tools to share and manage design data and distribute design tasks necessary when a design team is working on a complex product design. The AAX package also delivers capabilities for true Top-Down Design (TDD). The TDD tools provided in AAX have been developed to formalize the best practices for concurrent, team product development.

- Data Sharing Features (*Copy & Publish Geometry, External Copy Geometry features*) Using Copy & Publish Geometry features, critical geometry information is passed associatively to every member of the design team, providing team members with only the information pertinent to their task. External Copy Geometry features enable direct part-to-part references to be created without the need for an assembly.
- **Reference Scope Controls** Define and automate the enforcement of design rules, to ensure that only appropriate relationships are created within the context of the design. This ensures that designs can be re-used easily.
- **Global Reference Viewer and Reference Graph** Investigate and graphically understand all dependencies that exist within a design assembly. This provides a clear understanding of how change will be propagated in the design.
- 2D Layouts & 3D Skeleton Models Effectively manage and control critical design intent within dedicated 2D layouts. Layouts provide additional capabilities of providing automatic assembly, component replace, global control of parameters and driving dimensions through explicit assignment or logically controlled relationships.
- Inheritance Features 'Merge' geometry from one part into another part and have full access to the feature list, dimensions, parameters, and other items accessible via Family Tables.
- Pro/PROGRAM in Assembly Provide a programmatic mechanism to automate the modification and customization of an assembly. Logic can be built into the design that will prompt the user for the necessary values to create and store new configurations of the assembly.
- Assembly Level UDFs Enhance basic component and assembly feature creation.
- **Interchange groups** Provide the ability to create and edit interchange assemblies to automatically swap functional equivalent models into and out of an assembly.
- External Merge & Cutout Features Create merge and cutout features from other models, on a component with one or many other components. Does not require an assembly to create and maintain the relationship between components used in the Merge or Cutout operation.
- **Unplaced Components** Provides the flexibility to under constrain a component to be included later in the design cycle. This is useful for temporarily excluding components from the BOM and Mass Properties calculations.
- **Custom Regeneration** Control regeneration of specific components and subassemblies.
- Pro/PROCESS for ASSEMBLY Provides the ability to completely capture and document the entire assembly process. This includes unique sequence steps to provide models, views, and separate BOM listings within each step of the assembly process. This content can be further leveraged within the extended enterprise by publishing the results of the process steps to a web page for easy viewing using Pro/WEB-PUBLISH.



Pro/ENGINEER Wildfire Foundation Advantage Package

Pro/ENGINER Wildfire's Foundation Advantage Package contains the comprehensive basic assembly design tools including those previously available in the Assembly Performance Extension package. *Note: APX has been retired.*

- **PATENTED Shrinkwrap features** This patent technology can be used to significantly reduce the file size of a design (typically 70-90% smaller), and to protect intellectual property and design intent when designs must be shared. Non-associative export options include surface, faceted surface, and merge solid with control over the quality, hole filling, and whether or not to include quilts. Previously part of APX.
- Simplified Representations (including External and On-Demand Simp Reps) Allow the user to work on an associative subset of the assembly components. This subset can be defined using any combination of powerful rules, including by size, attribute, location, relationship, zone membership, etc. Ability to create customized representations that include a mixture of Graphics and Geometry Representations. Previously part of APX.
- **Envelope Parts** Entire collections of components can be represented by one single envelope part. Previously part of APX.
- Zone Creation easily organize assemblies into geometric Zones, which can later be used to easily select collections of components. Half-spaces, closed volumes, or distances define zones. Previously part of APX.
- Lightweight Components By using a graphical symbol, large numbers of parts (ie rivets or screws) can be accurately represented in an assembly without retrieving the entire part. This includes BOM and Mass Property info. Previously part of APX.
- Automatic Component Placement Using Component Interfaces, drag and drop parts from a web-based parts catalog or a file explorer into the assembly and the part will snap to the proper location. Previously part of APX.
- Assembly Creation Completely or partially constraining (package) components relative to one another.
- Flexible Components Place the same part into an assembly multiple times and show different configurations (i.e. one spring with different compression lengths)
- Automatic Component Placement Using Component Interfaces, drag and drop parts from a web-based parts catalog or a file explorer into the assembly and the part will snap to the proper location within the assembly.
- Assembly Features features that exist in either the assembly or part, such as holes and cuts that are machined only after the components are assembled.
- Family Tables Create families of assemblies, using Family Tables.
- **Exploded Views** With offset lines. This is new in the Foundation package as of Release 2001. Previously, this capability was available only with AAX.
- **Basic Top-Down Design capabilities**, as touted by other systems. This includes the ability to make external references from one assembly component to another. This has been possible in Pro/ENGINEER for years, but recently the competition has begun calling this top-down design.
- Manually Copy surfaces from one model to another within the context of an
 assembly to provide necessary references to enable creation of the part outside the
 context of the assembly. NOTE: this requires Advanced Surface Extension (ASX).
- Replace Components Either manually, by Family Table or by Interchange. This
 eliminates the need to delete the component and re-assemble the new component.
- Comprehensive Assembly Mass Properties calculations.
- Pairs and/or Global Clearance and Interference checks.
- Basic Pipe features Created within an assembly.
- **Mirrored Parts and Sub-Assemblies** Mirrored subassemblies utilize logical Reuse, Exclude, or New Name options.
- **Restructure Assembly Components** Dynamically adjust the hierarchy of components within various subassemblies.



Pro/ENGINEER Wildfire Foundation Advantage Package (Continued)

- Assembly Merge & Cutout Features Create Additive (Merge) and Subtractive (Cutout) features in an assembly with one or multiple components. Requires parts to be located with respect to one another in an assembly.
- **Component Display States** to control how various components will be displayed within an assembly to aid in visualization of a design. Components can be independently displayed as wireframe, hidden line, no hidden, shaded, or blanked.