



Autodesk Inventor 10 – What's New?

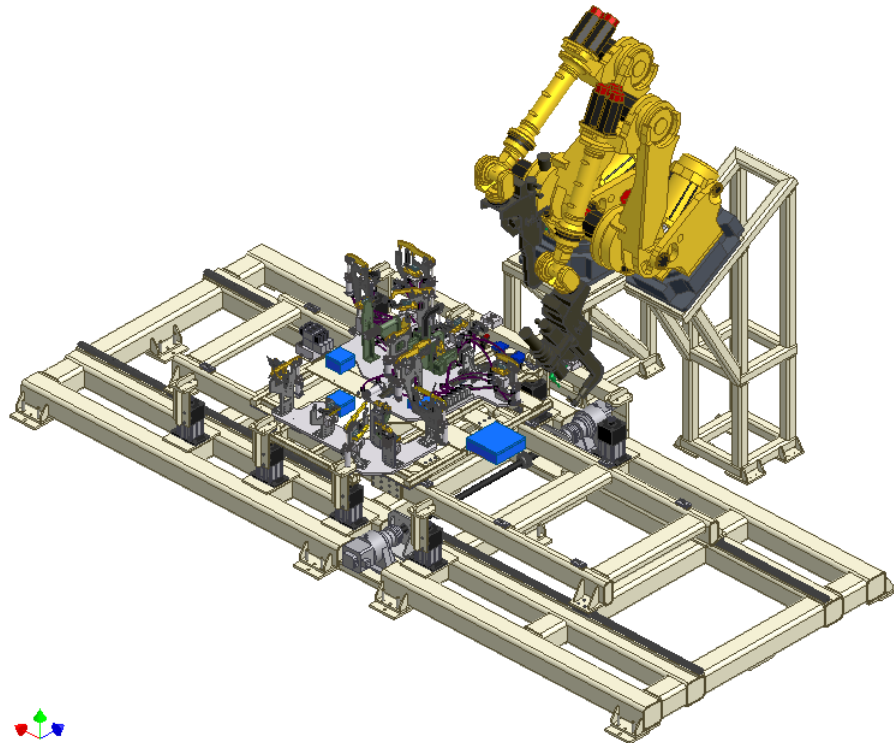
Autodesk®

Autodesk Inventor Series



Themes

- Powerful and Complete
- Create Quality
- Design Faster
- Production Ready
- Share
- Easier to learn



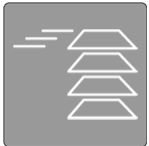
Autodesk Inventor 10



The power to design the complete product line



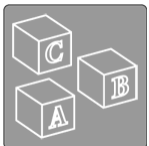
Deliver the design in less time



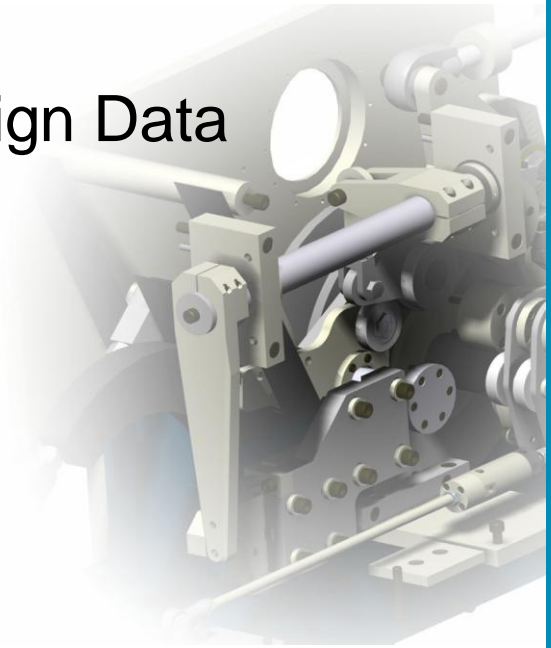
Fastest way to production ready drawings



Communicate and Manage Design Data



Fastest to learn and deploy



Autodesk Inventor 10



The power to design the complete product line



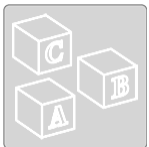
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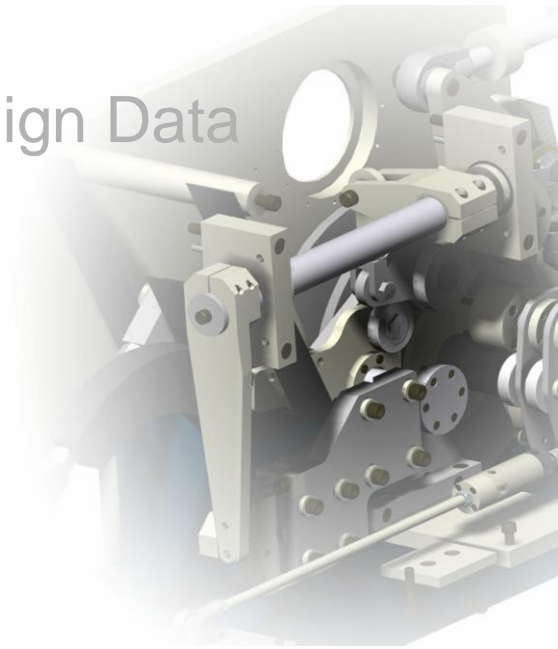
Fastest way to production ready drawings



Communicate and Manage Design Data



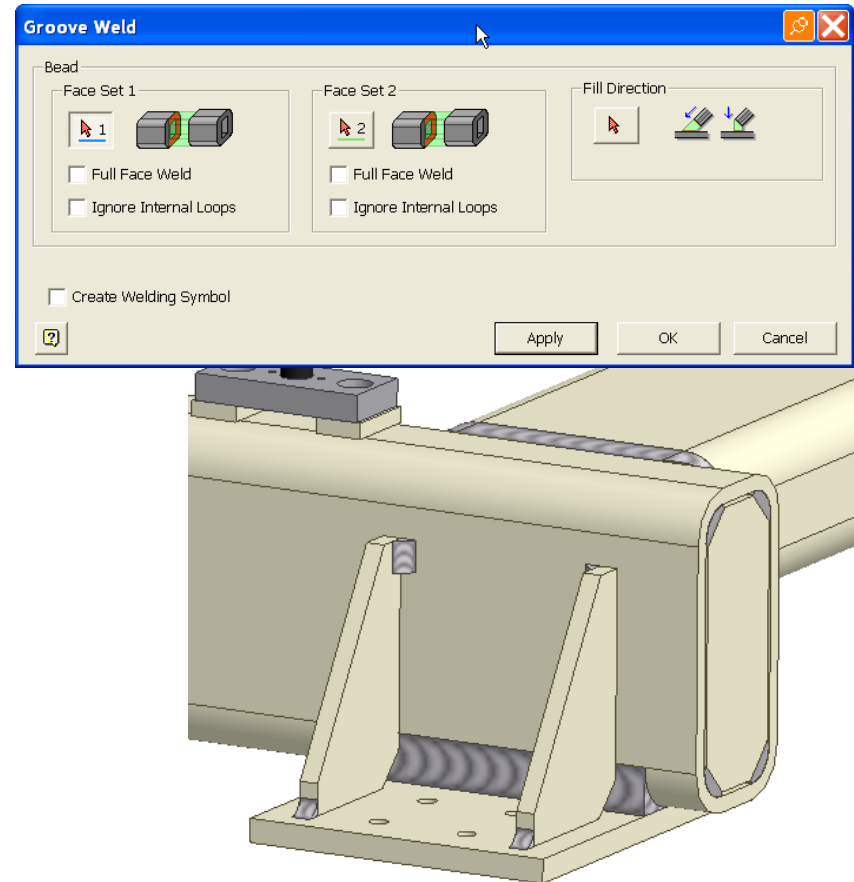
Fastest to learn and deploy



Enhanced Weldment Design



- New 3D gap/groove welds
- Enhanced 3D fillet welds
- Ability to modify weld preparations
- Streamlined weld symbol creation
 - Group multiple beads
- Analysis and reporting



Comprehensive best-in-class weldment design and analysis

Bill of Materials

- Manage assembly structure of purchased and non-purchased components
- Accurate reporting to data management
- Virtual components
- Comprehensive property editor

Bill of Materials [M862M9001 - Main Power Cabinet]

Structured | Parts Only

Show Row Merging

Item Order	BOM Structure	QTY	UOM	Part Number	Description
1	Normal	1	Each	M862M9001	Main Power Cabinet
2	Normal	3	Each	M862M9200	Secondary Power Tray
2.1	Normal	1	Each	M862M9201	Tray
2.2	Normal	1	Each	M862M9202	Face Plate
2.3	Normal	2	Each	M000M1056	Gussets
2.4	Normal	2	Each	M862M9201	Power Control Assy
2.4.1	Purchased	2	Each	CS-110-AC	Control Supply
2.4.2	Purchased	1	Each	REG-110-AC	Supply Regulator
2.4.3	Inseparable	1	Each	M862M9900	Power Control Enclosu...
2.4.3.1	Normal	2	Each	M862M9900-01	Front/Back Panel
2.4.3.2	Normal	2	Each	M862M9900-03	Side Panels
2.4.3.3	Purchased	28	Each	MS23549-003	#3 Rivets
2.4.3.4	Purchased	10	Each	AS-440	#4-40 PEM Fastener
2.4.4	Normal	1	Each	M862M9901	Cover
2.5	Purchased	2	Each	SR-173-250	Slide Rails
2.6	Purchased	48	Each	SC-1032-500	10-32x0.5 Btn Screw
2.7	Purchased	4	Each	DCS-12VDC-2	20 VDC 2 Amp Supply
2.8	Purchased	4	Each	AMP-16C-Z1	Circular Connector
2.9	Purchased	4	Each	AMP-9D-AA7	D-Sub 9 Pin Connector
2.10	Purchased	4	Each	SC-250-375	1/4-20 x .375 Btn Screw
3	Normal	2	Each	M862M9010	Cabinet
4	Normal	1	Each	M862M9020	Main Panel

OK Cancel Apply

Eliminate errors and save time generating consistent BOMs

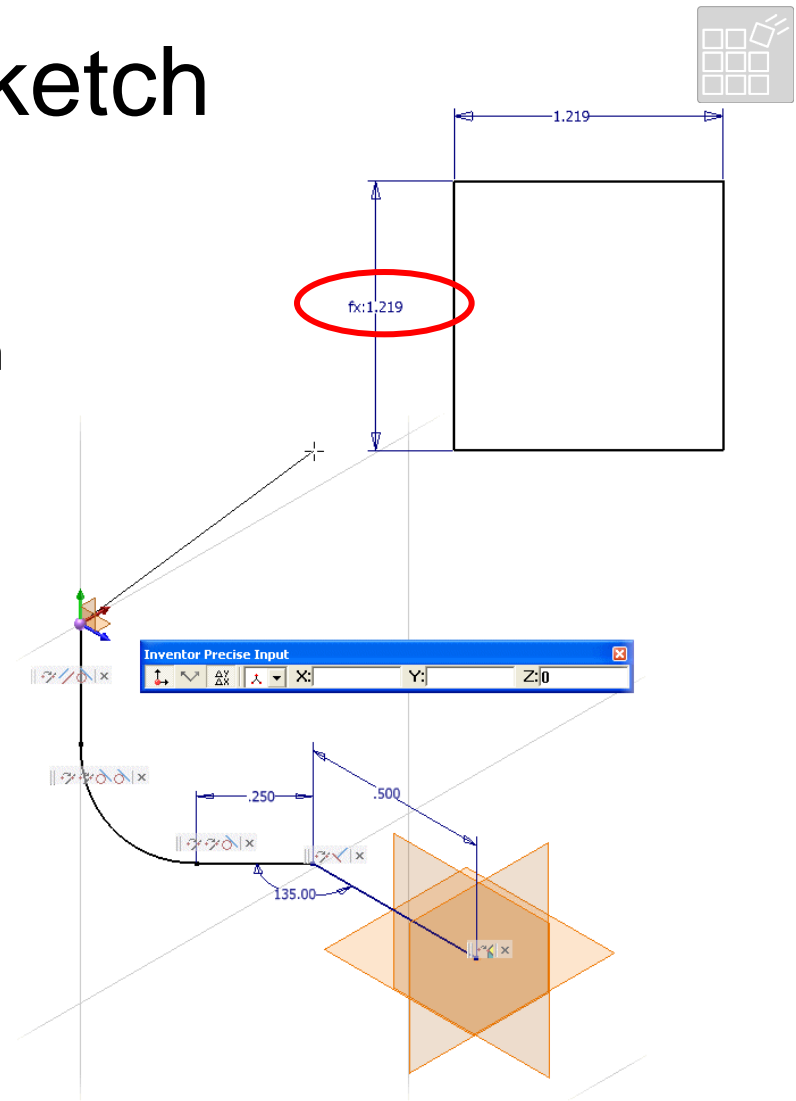
Enhanced 2D & 3D Sketch

2D Sketch

- Visually identify equation driven dimensions
- Show/Hide dimensions
- Create lines and splines using precise coordinates

3D Sketch

- Constraint based sketches and precise coordinate entry
- Freehand sketching
- Show 3D sketch in Drawing Manager



Rapidly create and manage conceptual 2D sketches for your designs

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The power to design the complete product line



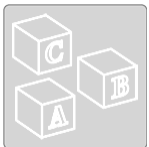
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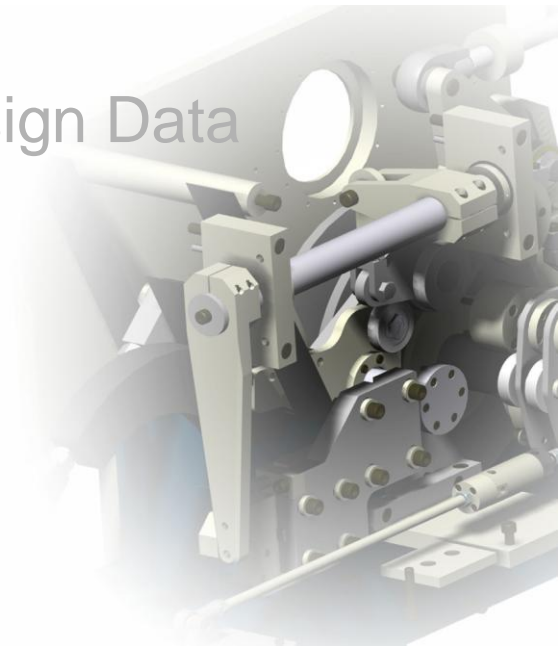
Fastest way to production ready drawings



Communicate and Manage Design Data



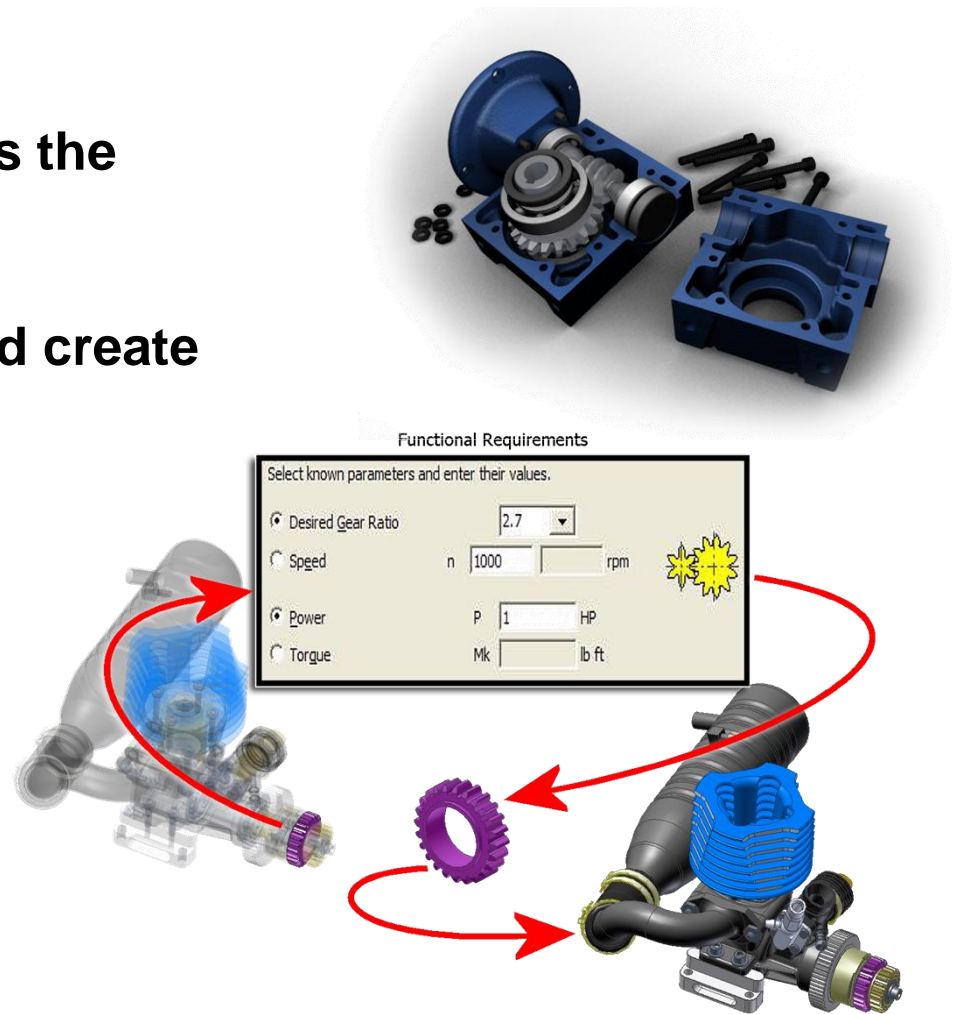
Fastest to learn and deploy



Design Accelerator



- Engineering function drives the design
- Rapidly design, analyze and create commonly used machine components
 - Component Generators
 - Mechanical Calculators
 - Engineer's Handbook

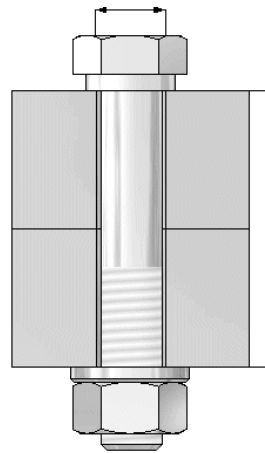


Accelerate beyond 2D and 3D with Functional Design

Component Generators



- Mechanical connections
- Shafts, hubs, and gears
- Belt and chain drives
- Power screws
- Springs
- O-Rings



Force Input Factor n

Examples of **force** may be defined simply as a push or a pull. loading

	$n = 1$ ($L_F = L$)	$n = 0.75$ ($L_F = 0.75 L$)	$n = 0.5$ ($L_F = 0.5 L$)	$n = 0.25$ ($L_F = 0.25 L$)

where: L_F ... width of the material loaded by the operation force

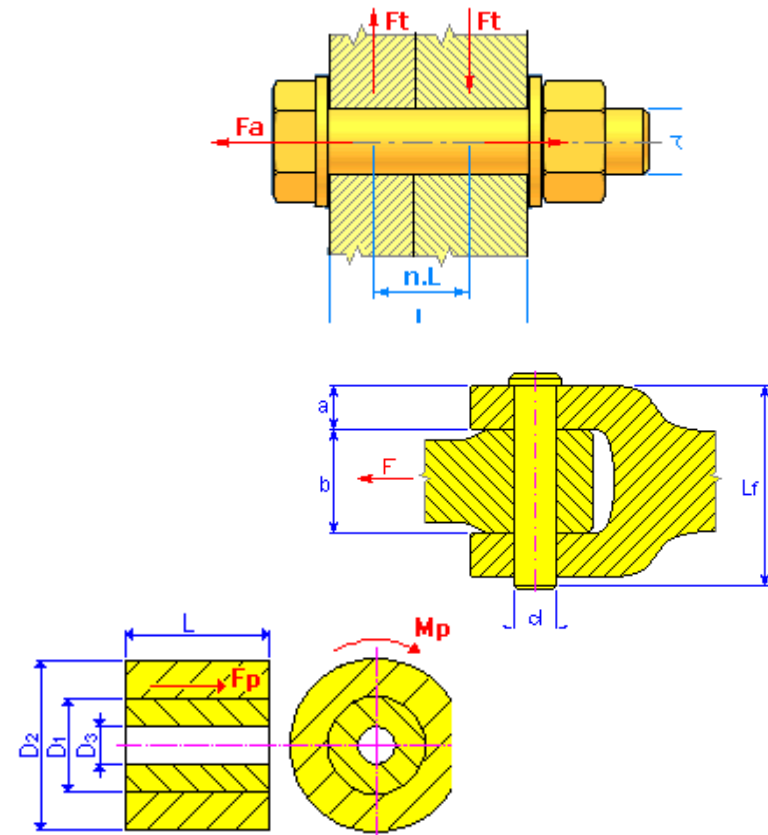
*Rapidly design, analyze and create machine components
based on functional requirements and specifications*

Mechanical Connection Generators



Create and validate mechanical connections based on industry standards for:

- Bolt and screw Connections
- Clevis pins
- Pins
- Pressure connections



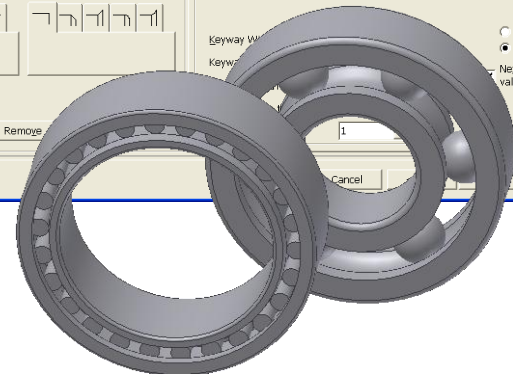
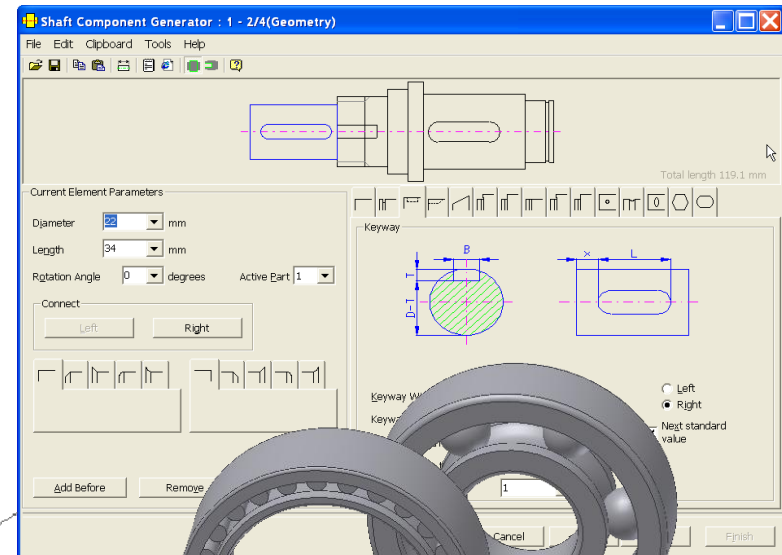
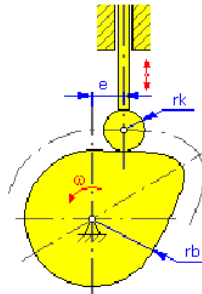
Confidently design mechanical connections

Shaft and Hub Generators



Automated shaft and hub design:

- Keyways
- Involute splines
- Straight-sided splines
- Cams
- Bearings



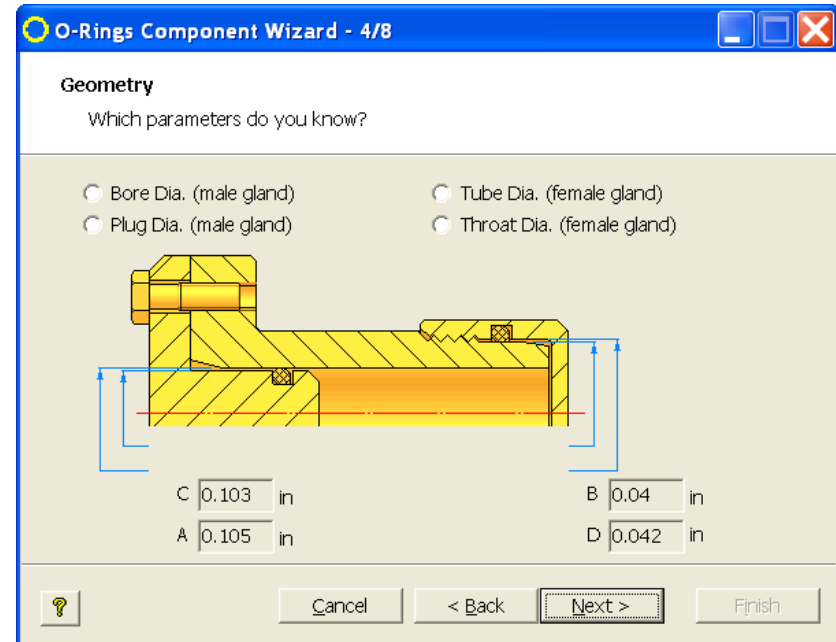
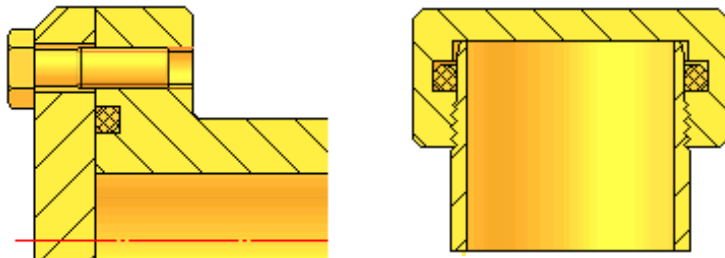
Rapidly design, validate and create

O-Ring Generator



Easily calculate, design and place o-ring seals

- Industrial static seals
- Face seals



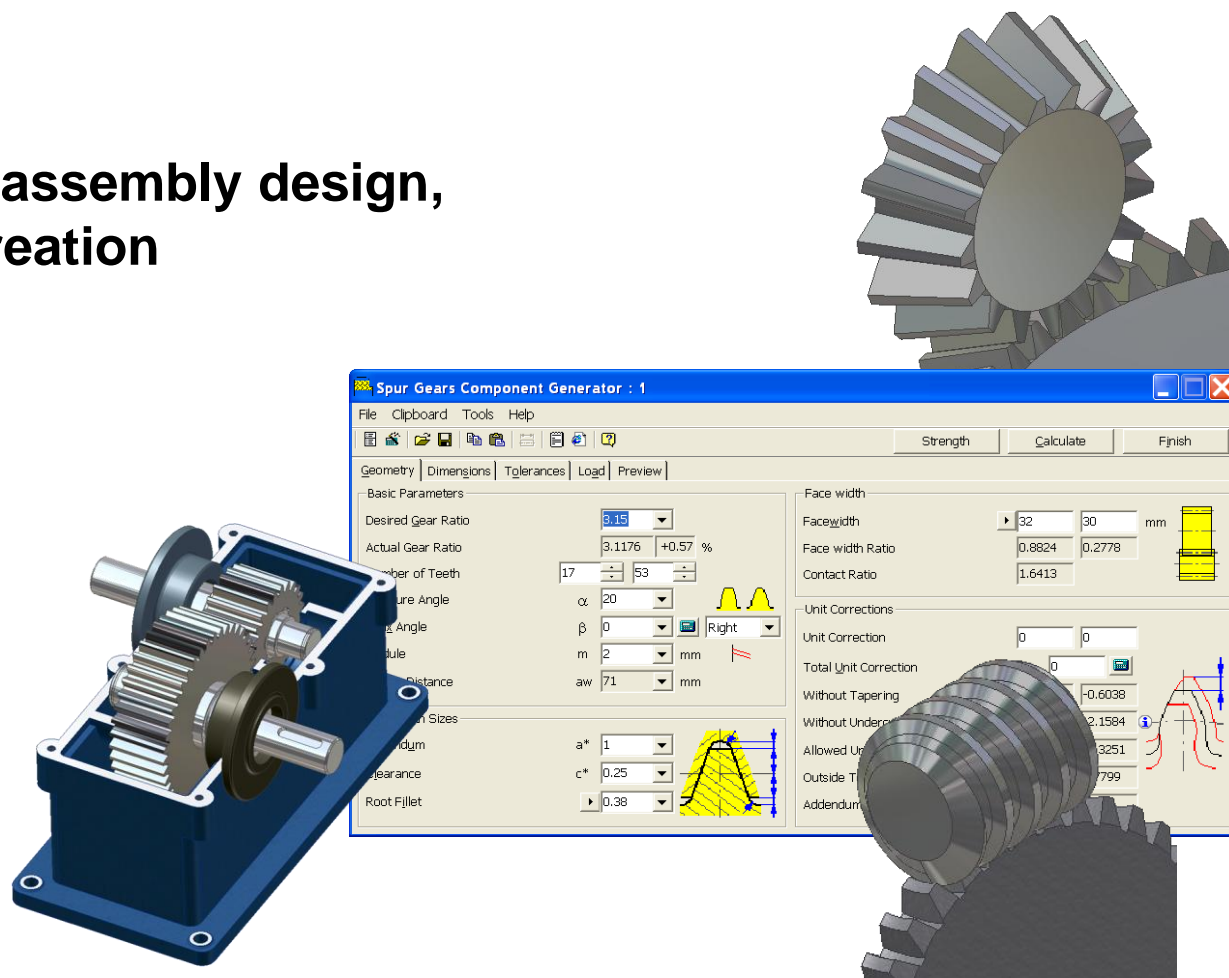
Automate O-Ring seal creation

Gear Design Generator



Automated gear assembly design, validation and creation

- Spur gears
- Bevel gears
- Worm gears

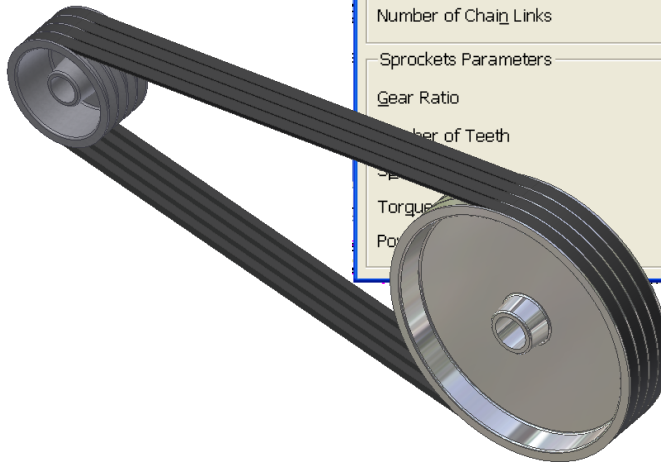


Rapidly design, validate and create gear assemblies

Belt and Chain Drive Generator



- Chains
- Narrow V-belt
- Indented-belt



Roller Chains Component Generator : 1

File Clipboard Tools Help

Calculate Finish

Geometry Dimensions Strength Resonance

Basic Parameters

Chains, Roller Chains Component Generator

Chains ISO 10190:1992, Roller Chains Component Generator - Bush Chains

Chains ISO 487:1998, Roller Chains Component Generator - Bush Chains

Chains, Roller Chains Component Generator

Chains ISO 1275:1984, Roller Chains Component Generator - Extended Pitch Precision Roller Chains

Chains ISO 1395:1977, Roller Chains Component Generator - Bush Chains

Number of Chain Strands	r	1	08 B	12.700	8.51	7.75	3
Number of Chain Links	x	48	081	12.700	7.75	3.30	1

Sprockets Parameters

	1	2	3	4
Gear Ratio	i	2.2		
Number of Teeth	N	15	33	
Speed	n	480	218.1818	
Torque	T	1.9894	4.245	
Power	Px	100	0	0

rpm

Nm

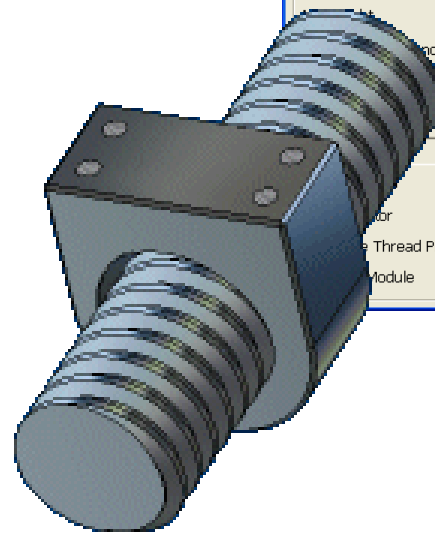
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Optimize design of chain and belt drive systems

Power Screw Generator



Lead screw system
design, validation and
creation



Power Screw Component Generator : 1

File Clipboard Tools Help

Calculate Finish

Load

Max. Axial Force F 225 lb

Max. Torque T 0.813 lb ft

Thread Friction Factor f1 0.15

Screw

Thread Diameter d 0.4375 in

Pitch p 0.0833 in

Mean Screw Diameter ds 0.3958 in

Min. Screw Diameter dmin 0.3525 in

H 2 in

Conditions n 1

L 12 in

Re 45000 psi

ks 3

pa 1000 psi

E 29700 ksi

Calculation Results

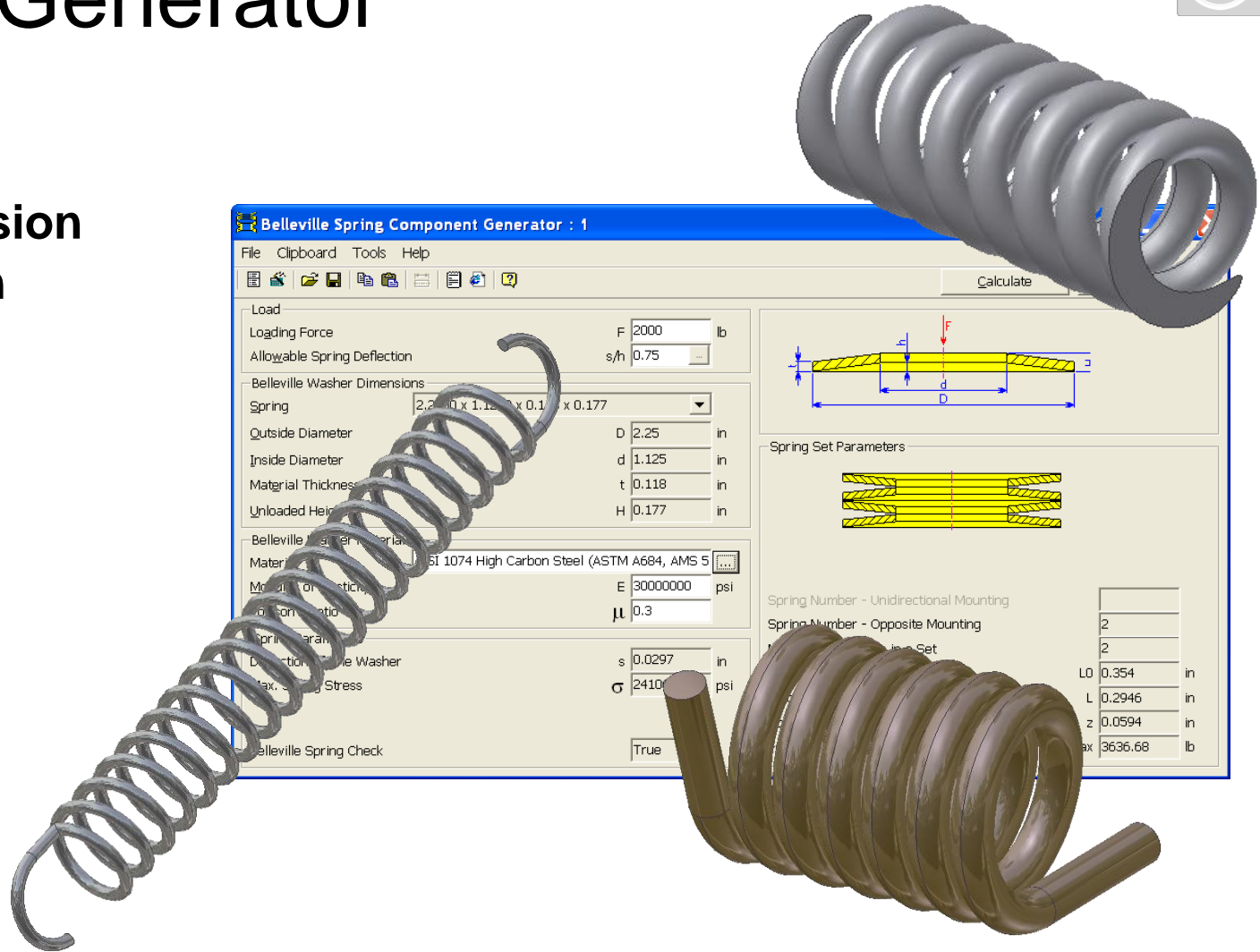
Reduced Length	Lred	12	in
Efficiency	η	0.306	
Slenderness Ratio	λ	121.27	
Pressure Stress	σ_t	2305.55	psi
Torsional Stress	τ_k	1134.88	psi
Reduced Stress	σ_{red}	3029.75	psi
Rankin Critical Stress	σ_R	13812.96	psi
Euler Critical Stress	σ_E	19930.83	psi
Johnson Critical Stress	σ_J	19599.65	psi
Calculated Thread Pressure	pc	240.98	psi
Calculated Factor of Safety	kv	5.991	
Strength Check		True	

Design to functional requirements, validate and create

Spring Generator



- Compression
- Extension
- Torsion
- Belleville

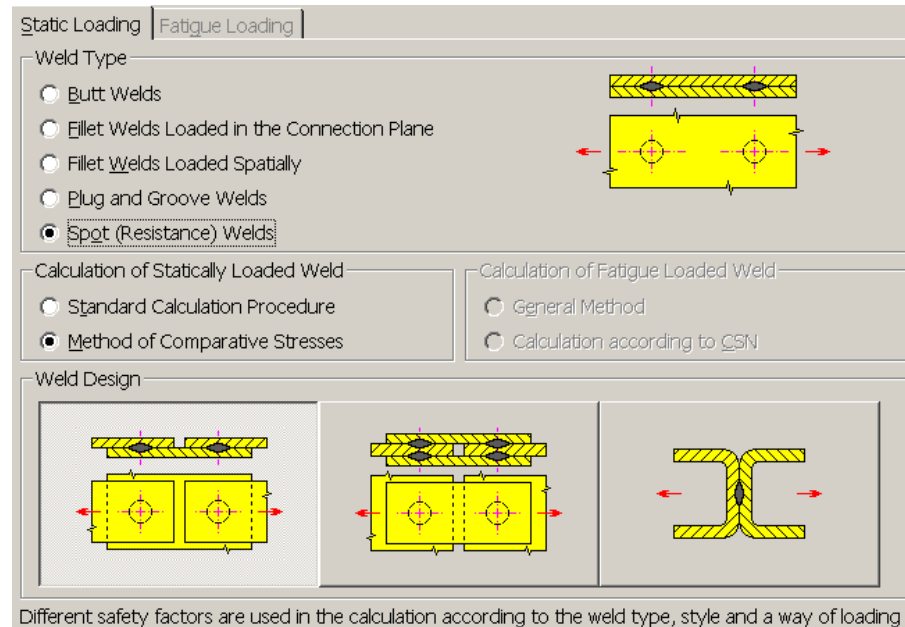
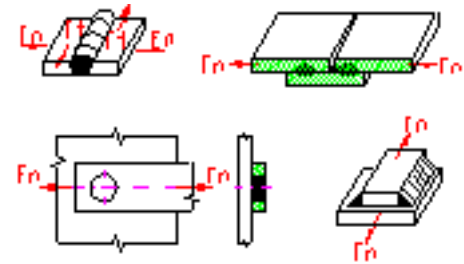


Automate spring design for predictable results the first time

Mechanical Calculators



- Weld and solder joints
- Plates
- Bearings
- Brakes
- Clamping joints
- Fit and tolerance



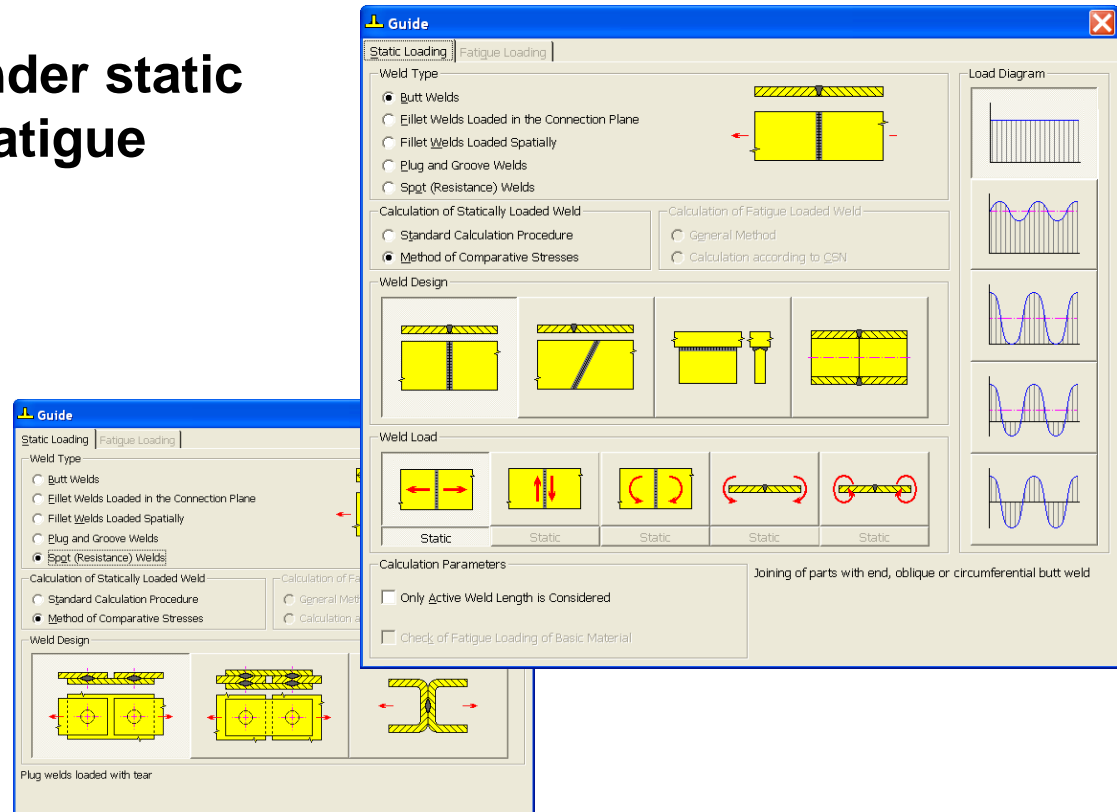
Avoid costly rework and improve design efficiency

Weld and Solder Calculator



Design and analyze under static or dynamic loads for fatigue strength.

- Plugs welds
- Slots welds
- Butt welds
- Solder joints

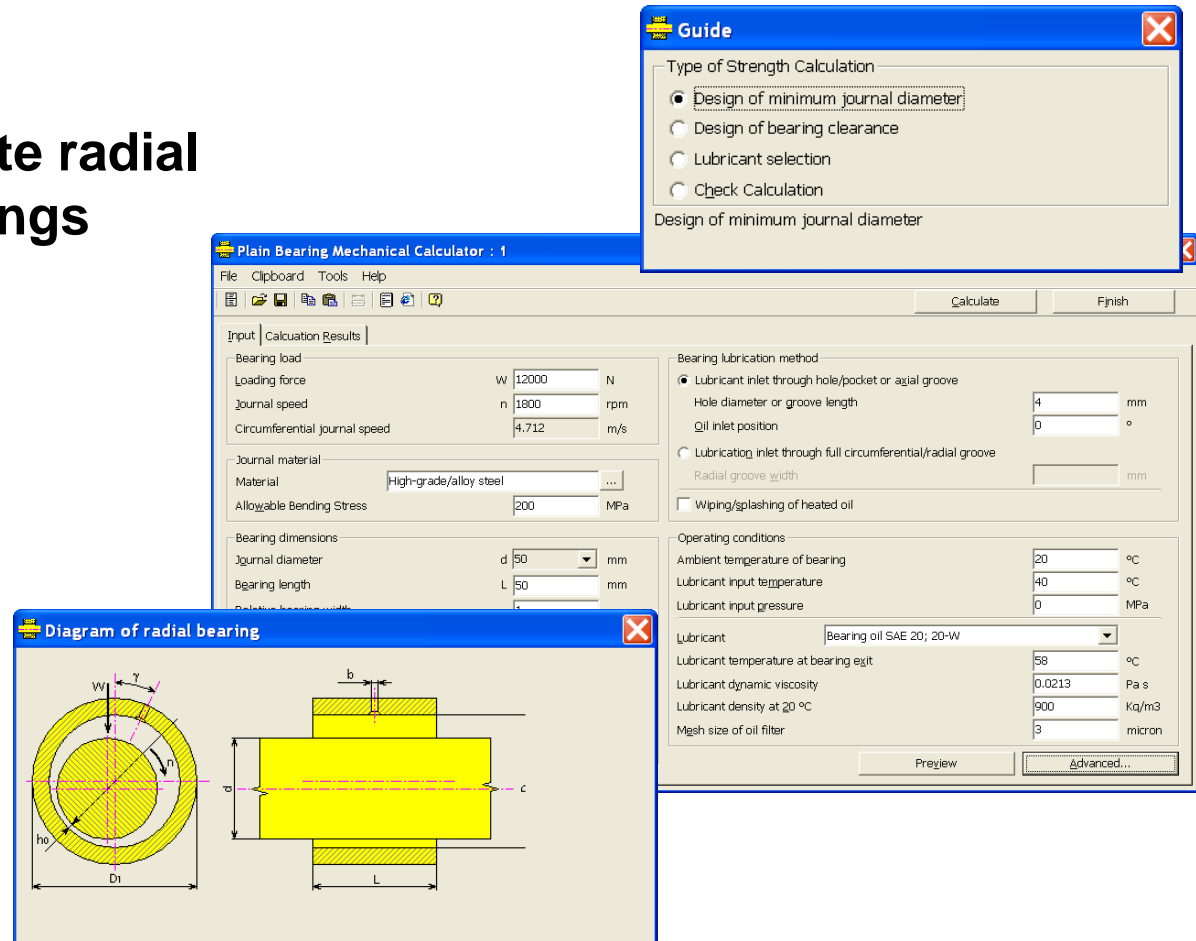


Avoid costly rework of weldments and soldered connections

Plain Bearing Calculator



Design and validate radial loaded plain bearings



Optimize bearing life using proven engineering principals

Plate Calculator



Design and validate plates

- Circular
- Square
- Rectangular

Plate Mechanical Calculator : 1

File Clipboard Tools Help

Calculate

Load

Total load F 225 lb

Uniformly distributed load p 56.25 psi

Dimensions of Plate

Plate Thickness t 0.0765 in

Length of plate L 2 in

Length of plate (short side) l 2 in

Material

Steel SAE 5160

Yield Strength Re 77000 psi

Safety Factor ks 3

Elasticity Module E 30000 ksi

Poisson's Ratio μ 0.3

Calculation Results

Deflection d 0.000934 in

Rotation at the support position ϕ

Max. stress σ_{max} 11918.49 psi

Calculated Factor of Safety k 3.776

Strength Check True

Guide

Shape of plate

☐ Circular Flat Plate

☐ Square Flat Plate

☒ Rectangular Flat Plate

Support type

☐ Supported edges

☒ Fixed edges

Type of load

☒ Uniformly distributed load over the surface

☐ Concentrated load at the center

Type of Strength Calculation

☐ Design of plate thickness

☐ Design for specified deflection

☐ Design of minimal material values

☒ Strength check

Load Input

☒ Total load

☐ Uniformly distributed load

Rectangular Flat Plate

Optimize and validate the design of plates

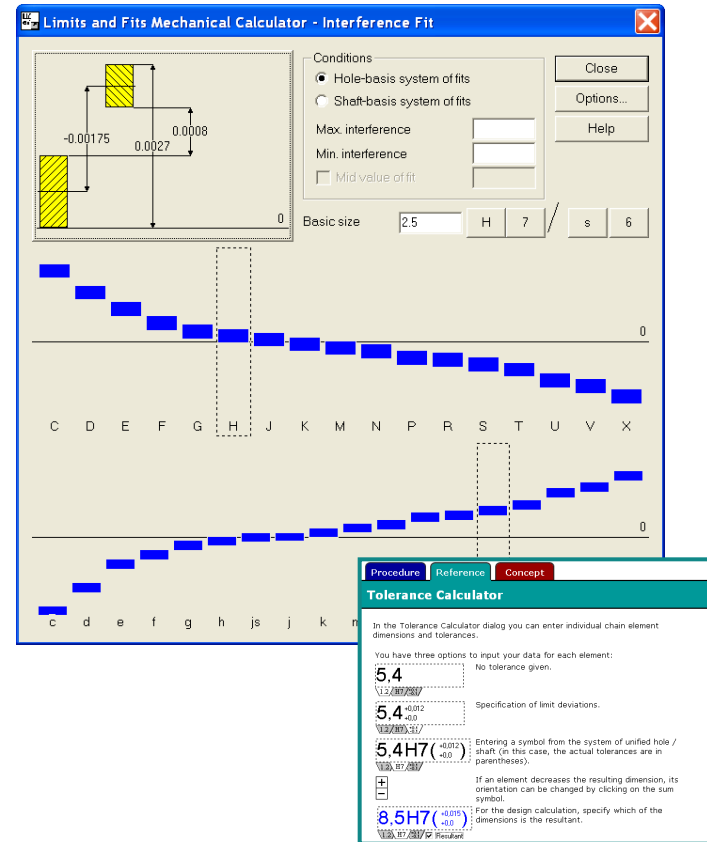
Fit and Tolerance Calculators



Design and validate shafts and holes based on:

- Clearance
- Transition
- Interferences

Calculate chains of dimensions and tolerances existing within parts or assemblies



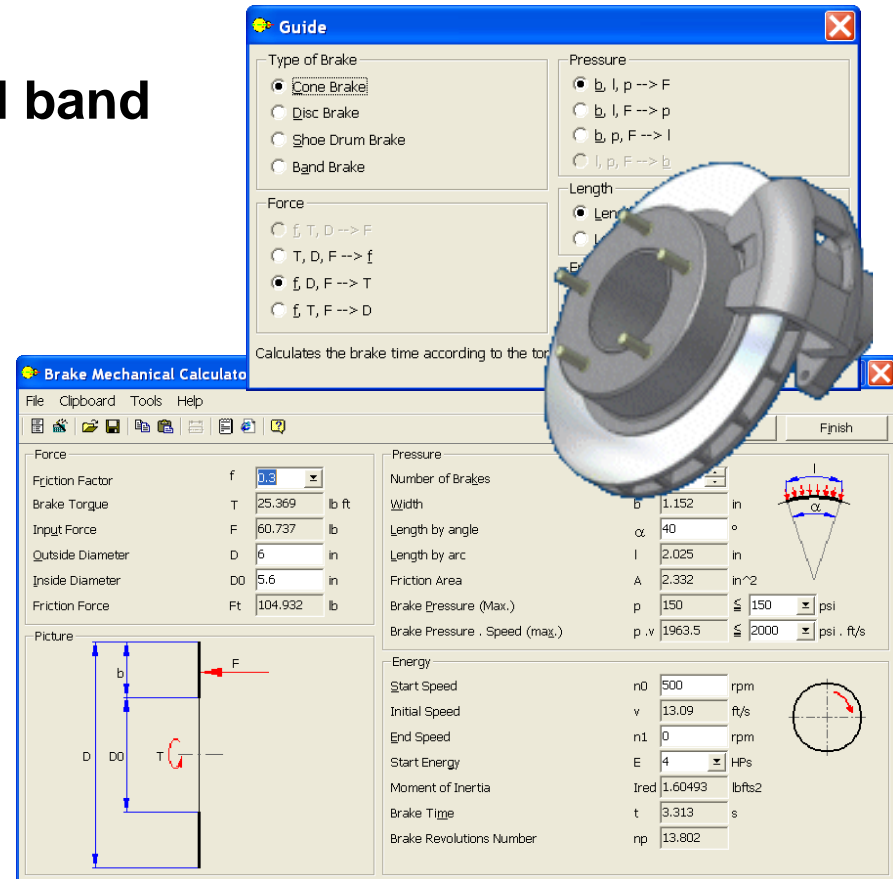
Gain insight on fits and tolerances and improve design quality

Brake Calculator



Calculate cone, disc, shoe and band brake systems based upon:

- Braking torque
- Forces
- Pressure
- Dimensional restrictions
- Time and revolutions for stopping



Optimize for mechanical conditions and avoid braking failures

Clamping Joint Calculator



Calculate and validate clamping joints based upon standard machinery practices

- Separate hub
- One-sided hub
- Cone hub

Clamping Joint Mechanical Calculator : 1

File Clipboard Tools Help

Calculate Finish

Load

Torque T 40 lb ft

Axial Force Fa 300 lb

Dimensions

Shaft Diameter d 1 in

Hub Length L 1.5 in

Outer Hub Diameter D 1.2 in

Hub Thickness s 0.2 in

Pitches b 1 c 0.5 in

Bolt Properties

Bolt Material User

Bolt Diameter 6188 psi

Bolt Grade 4

Calculation Results

Min. Hub Length 0.52749 in

Calculated Pressure 4001.888 psi

Force per Bolt 500.236 lb

Deformation Force 90.158 lb

Total Force per Bolt 522.7755 lb

Bolt Diameter 0.375 in

Joint Check True

Guide

Clamping Joint Type

☐ Separated Hub

☒ Slotted Hub

☐ Cone Joint

Strength Calculation

☒ Hub Length Design

☐ Shaft Diameter Design

☐ Check Calculation

Dimension Input

☒ d, D --> s

☐ d, s --> D

Screw Tension Calculation

☐ No Clamp deformation

☒ Consider the Clamp deformation

Deformation Force Calculation Type

☒ Deformation Force Calculation

☐ Deformation Force Input

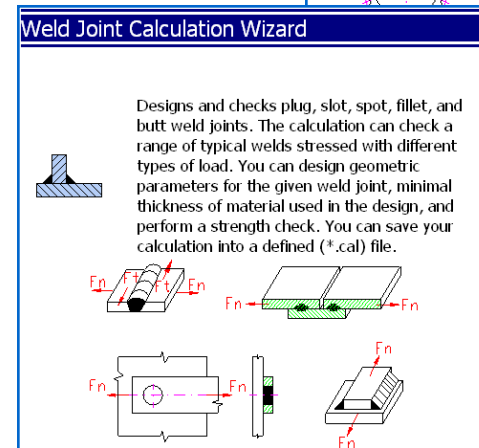
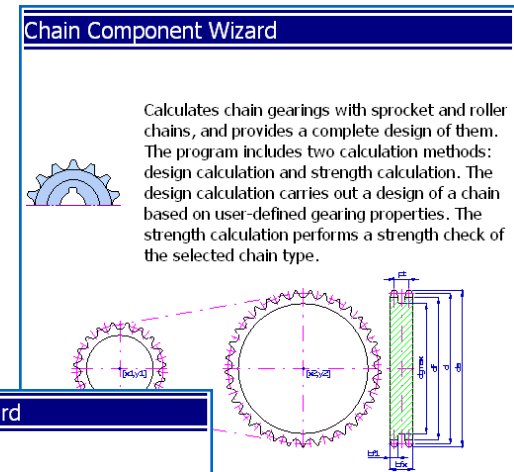
Clamping joint with separated hub

Remove the guesswork and improve design quality

Engineer's Handbook



- Engineering theory, formulas and algorithms used in machine design
- Industry proven machinery design reference library
- Background reference and theory for generators and calculators

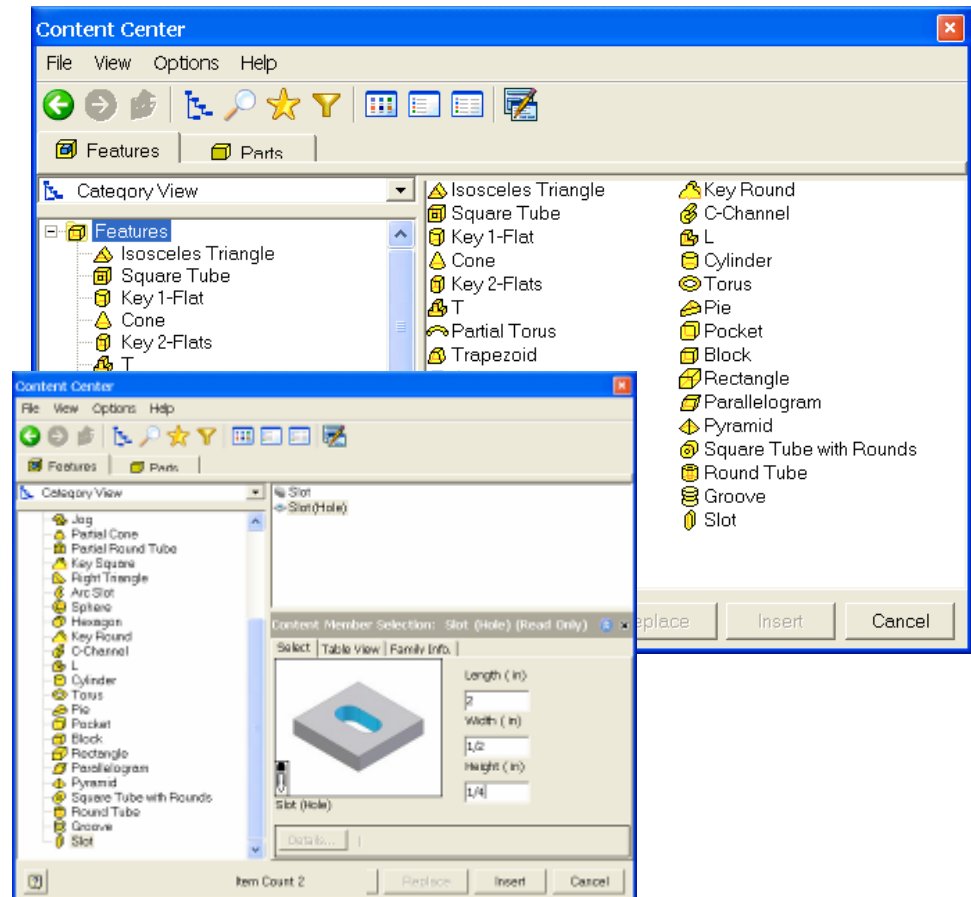


Dramatically save time researching engineering information

Feature Generator



- Easy transition to parametric modeling
- Drag-n-drop operations
- Features can be edited by 3D Grips

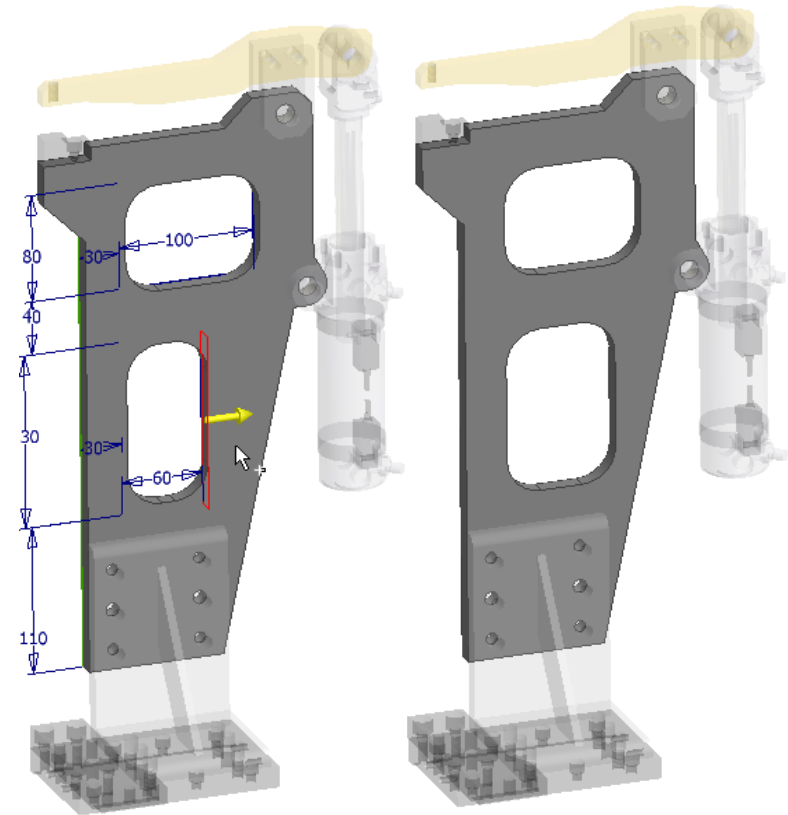
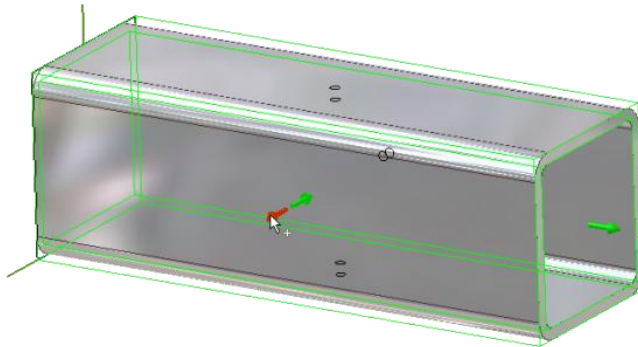


Accelerate 3D design with intelligent drag and drop feature creation

3D Grips



- Feature modification with AutoCAD-like “Grip” editing
- Edit new and existing designs

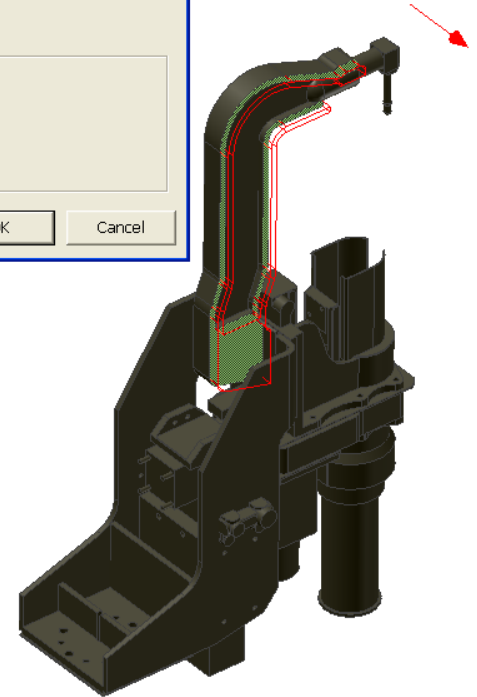
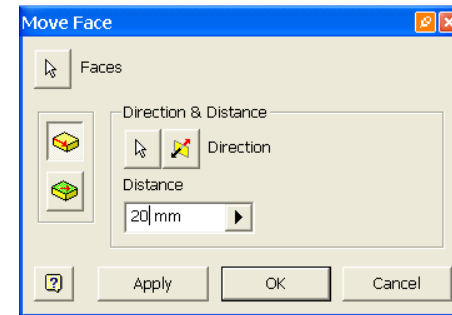


Speed design change with intuitive drag-based editing

Modeling Enhancements



- Move face editing of parametric parts
- Optimized variable radius fillets
- Loft smoothing
- Support median tolerances
- Parameters Dialog
 - Tab between columns
 - Remember column size
- Delete/Suppress below the browser stop node
- iPart hole update when thread changes

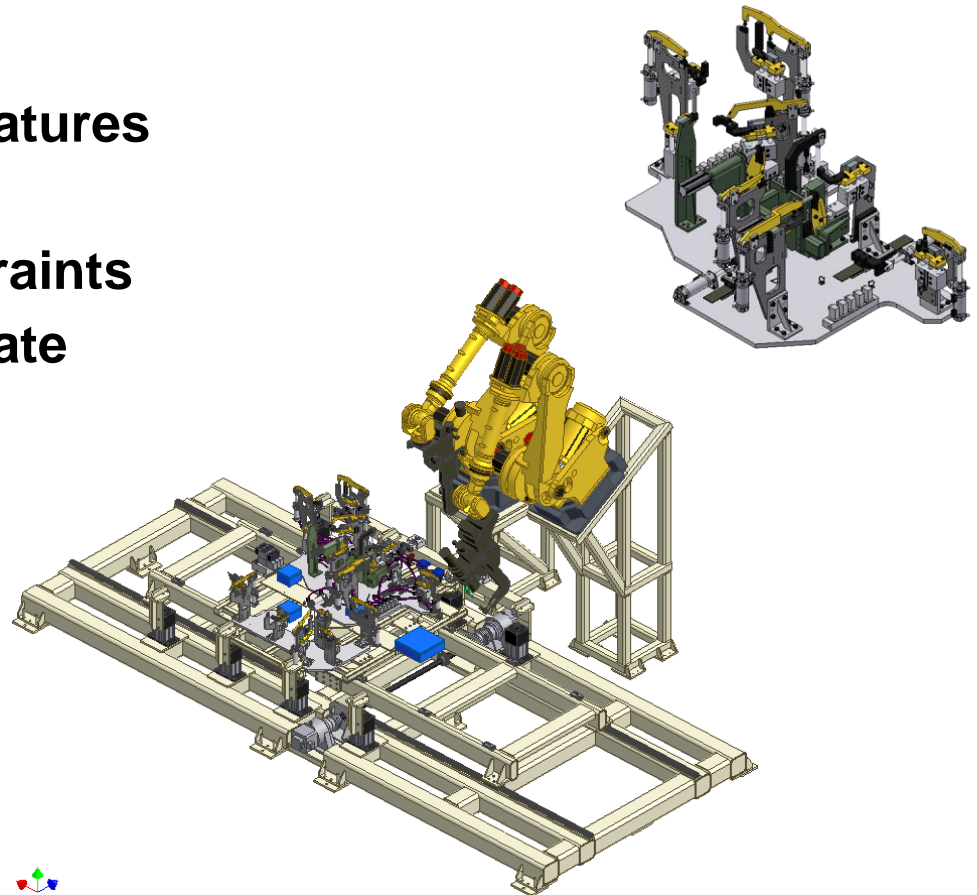


Design more innovative products with advanced modeling tools

Assembly Enhancements



- Patterning of Assembly Features
- Assembly Mirror and Copy
- Enhanced assembly constraints
- Improved derived part update performance



Design more innovative products with advanced assembly tools

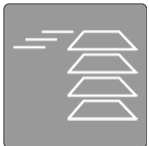
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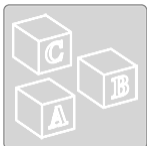
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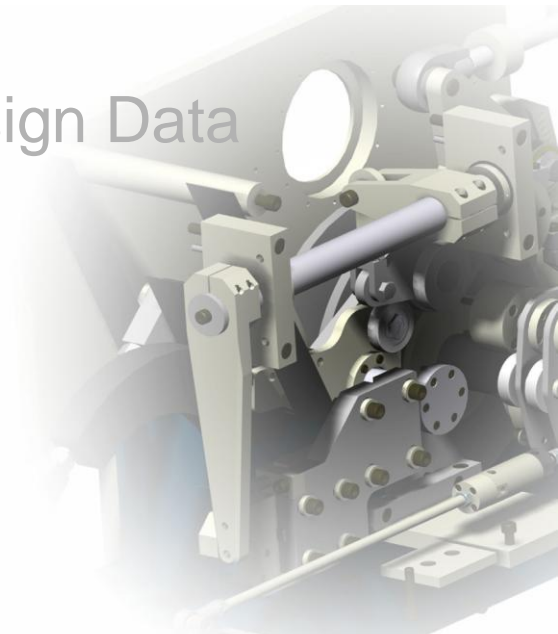
Fastest way to production ready drawings



Communicate and Manage Design Data

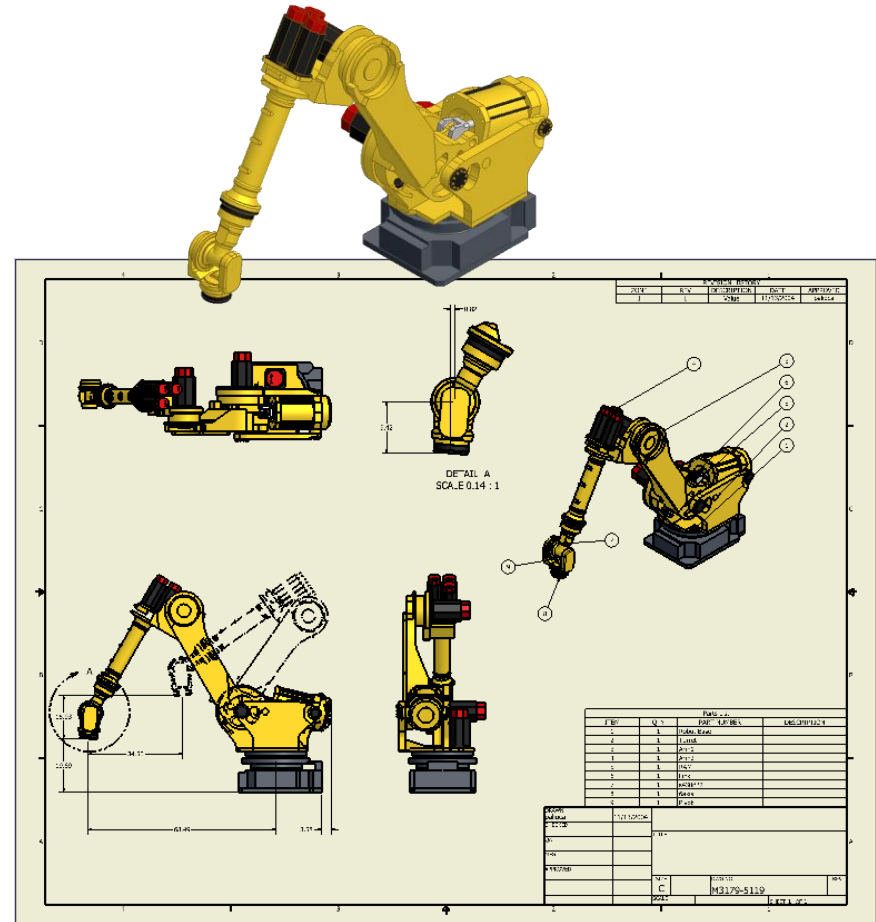
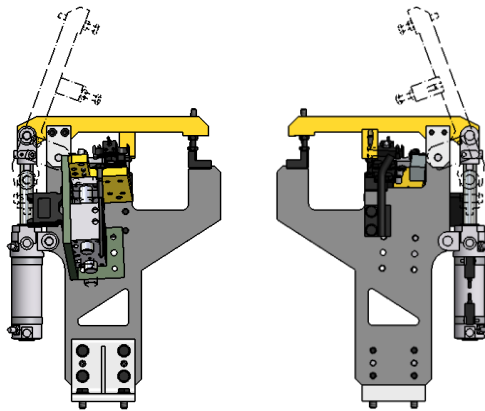


Fastest to learn and deploy



Positional Overlays

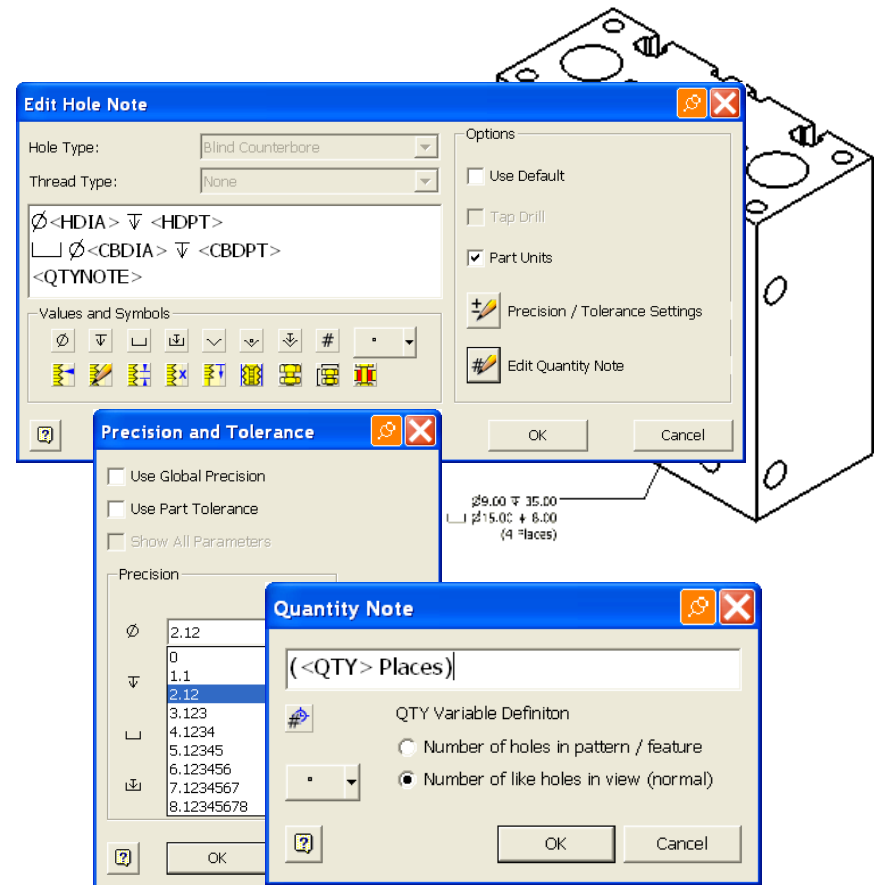
- Create drawing views which overlay design motion



Quickly and easily capture design positions on assembly drawings

Hole and Thread Notes

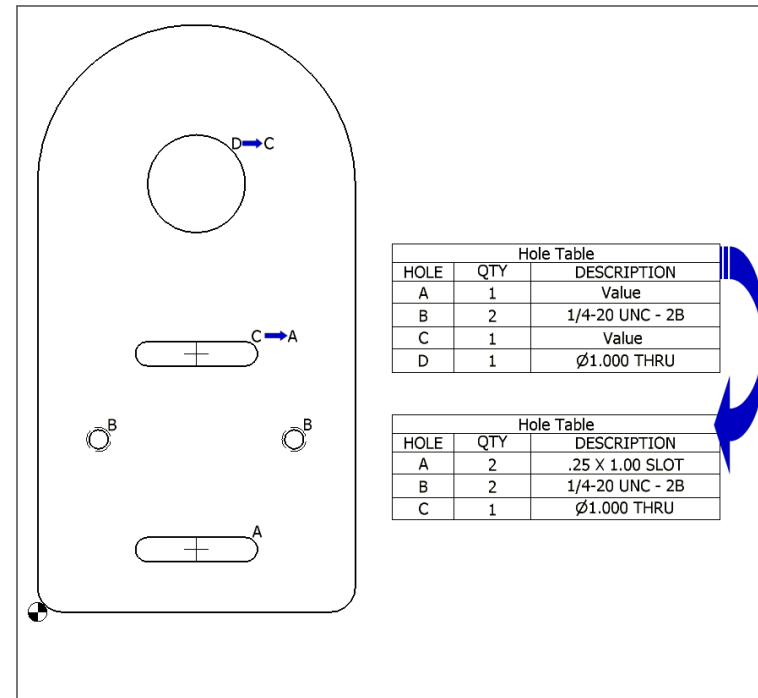
- Precision on all parameters
- Custom thread designations
- Recover fastener clearance information
- Insert user defined hole quantity notes
- Rollup quantity for identical holes



Provides greater flexibility for documenting your design

Hole Tables

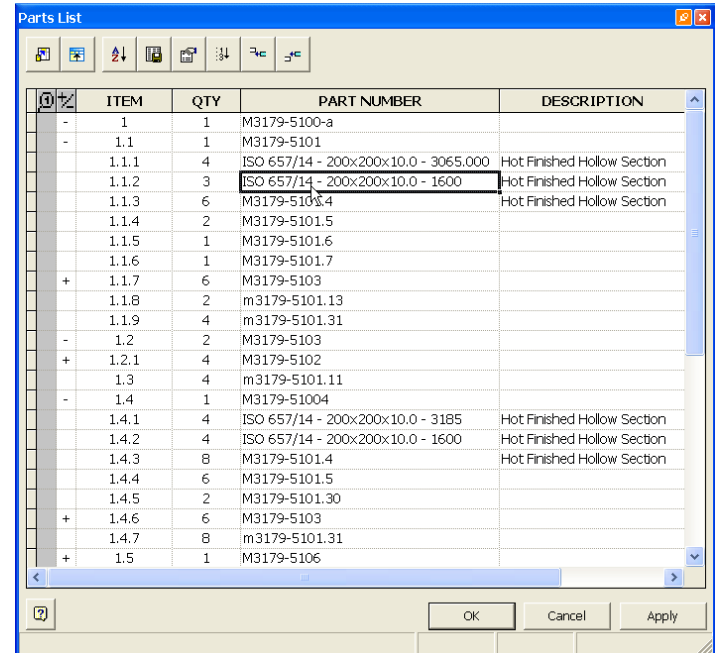
- Sort and tag hole tables
- Insert custom descriptions and positional tolerances
- Recognize circular cuts, iFeatures and center-marks as hole table features



Provides greater flexibility for documenting your design

Parts List

- Add multiple parts lists on a single drawing
- Create without a drawing view
- Edit properties, group line items, sum rows, and control visibility
- Maintain consistent item numbering across multiple sheets in Drawing Manager and Presentations.

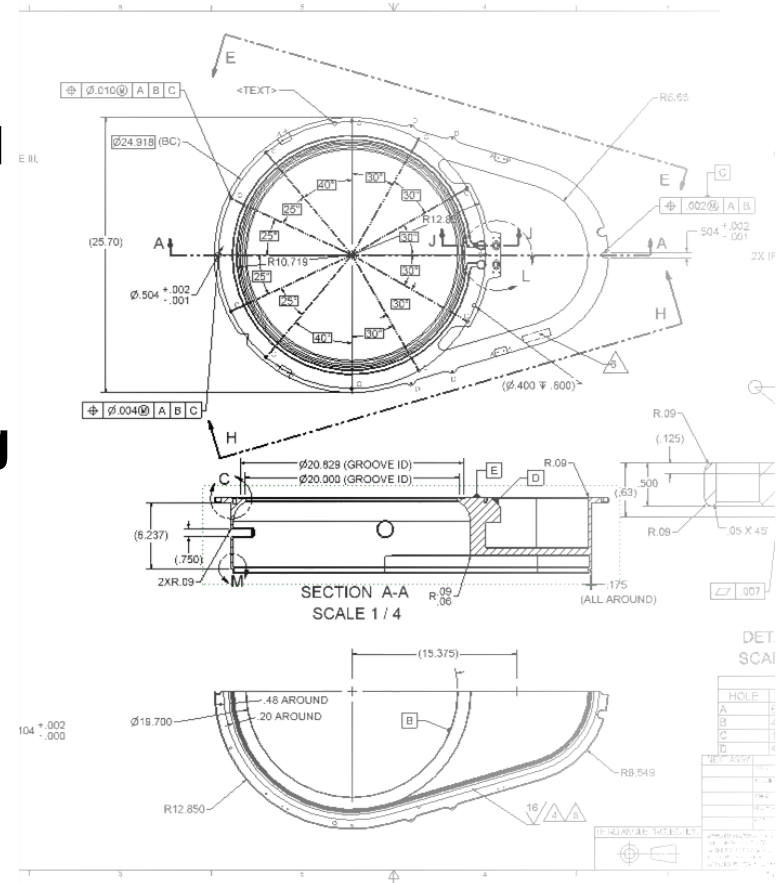


	ITEM	QTY	PART NUMBER	DESCRIPTION
-	1	1	M3179-5100-a	
-	1.1	1	M3179-5101	
	1.1.1	4	ISO 657/14 - 200x200x10.0 - 3065.000	Hot Finished Hollow Section
	1.1.2	3	ISO 657/14 - 200x200x10.0 - 1600	Hot Finished Hollow Section
	1.1.3	6	M3179-5101.4	Hot Finished Hollow Section
	1.1.4	2	M3179-5101.5	
	1.1.5	1	M3179-5101.6	
	1.1.6	1	M3179-5101.7	
+	1.1.7	6	M3179-5103	
	1.1.8	2	m3179-5101.13	
	1.1.9	4	m3179-5101.31	
-	1.2	2	M3179-5103	
+	1.2.1	4	M3179-5102	
	1.3	4	m3179-5101.11	
-	1.4	1	M3179-51004	
	1.4.1	4	ISO 657/14 - 200x200x10.0 - 3185	Hot Finished Hollow Section
	1.4.2	4	ISO 657/14 - 200x200x10.0 - 1600	Hot Finished Hollow Section
	1.4.3	8	M3179-5101.4	Hot Finished Hollow Section
	1.4.4	6	M3179-5101.5	
	1.4.5	2	M3179-5101.30	
+	1.4.6	6	M3179-5103	
	1.4.7	8	m3179-5101.31	
+	1.5	1	M3179-5106	

Reduce costly errors with automatic creation of assembly parts list

Drawing Enhancements

- Drawing view creation of surfaces
- Drawing Resource Transfer Wizard
- Auto Centerline Retrieval
- Styles – Layers & Holes
- Hidden Lines of References Parts
- AutoCAD Mechanical 2006 drawing views of assemblies



Save time creating and managing drawings

Autodesk Inventor 10



The power to design the complete product line



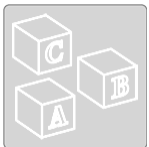
Deliver the design in less time



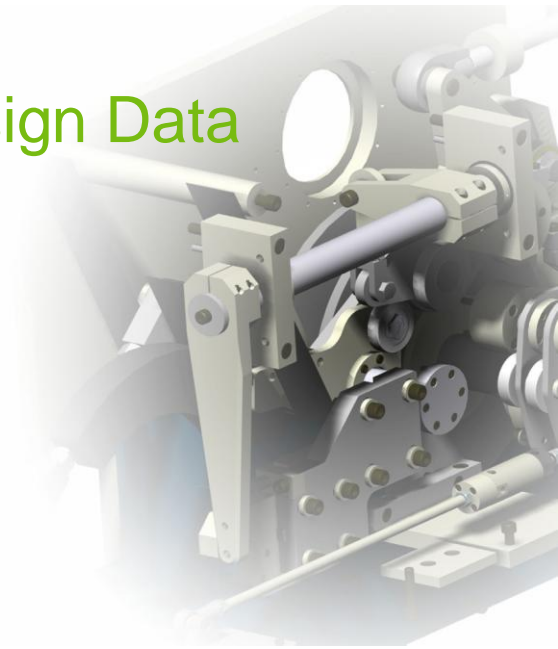
Fastest way to production ready drawings



Communicate and Manage Design Data



Fastest to learn and deploy



IGES and STEP Import & Export



- Increased performance importing large STEP files
- Increased control of imported data
 - Support “Layers” in STEP
 - Support “Levels” in IGES
 - Improved automatic surface healing

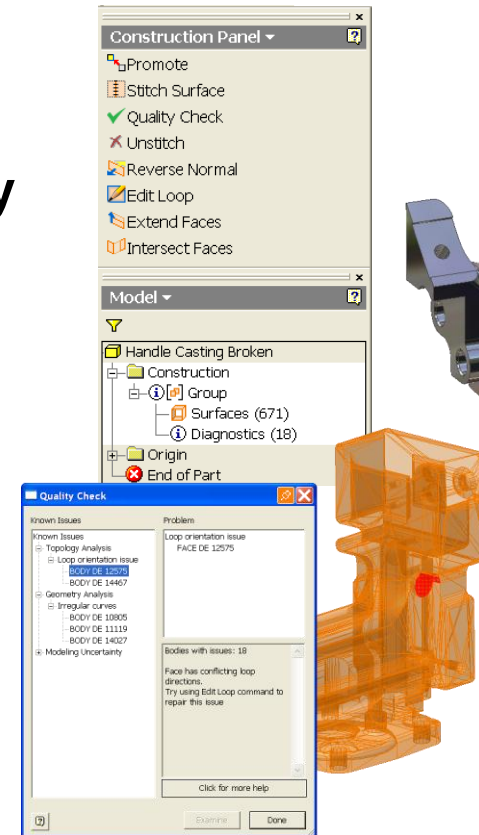


Reliable, easy, accurate collaboration, re-use and sharing



Construction Environment

- Organize, inspect imported geometry in preparation for use
- Group by layer, level and geometry type
- Edit and clean up surfaces
 - Trim and extend
 - Quilting
 - Flip face normals
- Quality checking
- Update IGES/STEP

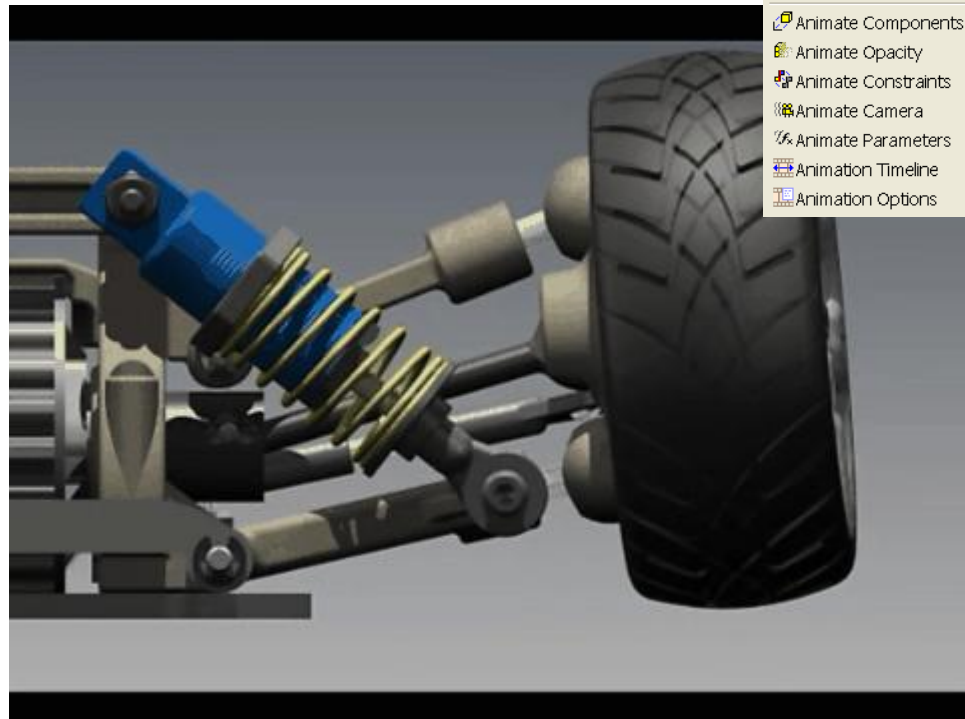


Easy, accurate collaboration, re-use and sharing

Autodesk Inventor Studio



- **State-of-art photo-realistic rendering and animations**
- **Streamlined within the design environment**



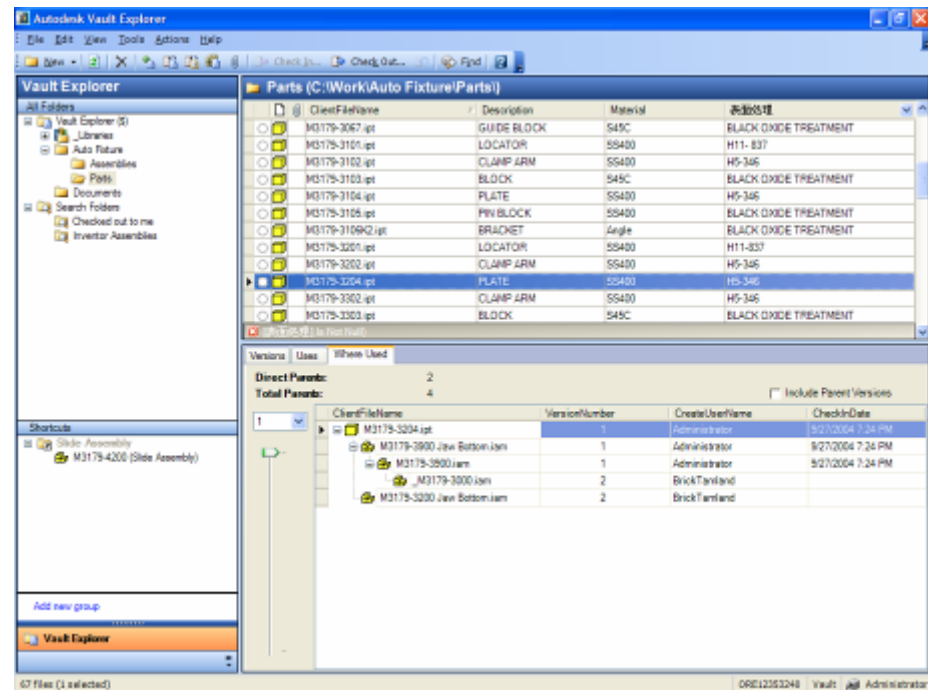
Create compelling images and quickly illustrate concepts

Autodesk Vault



Autodesk Vault provides easy-to-use work-in-progress data management integrated with the design applications you use today

- Manage Work-in-Progress
- Easy to Use and Administer
- Organize & Reuse
- Protect and Secure

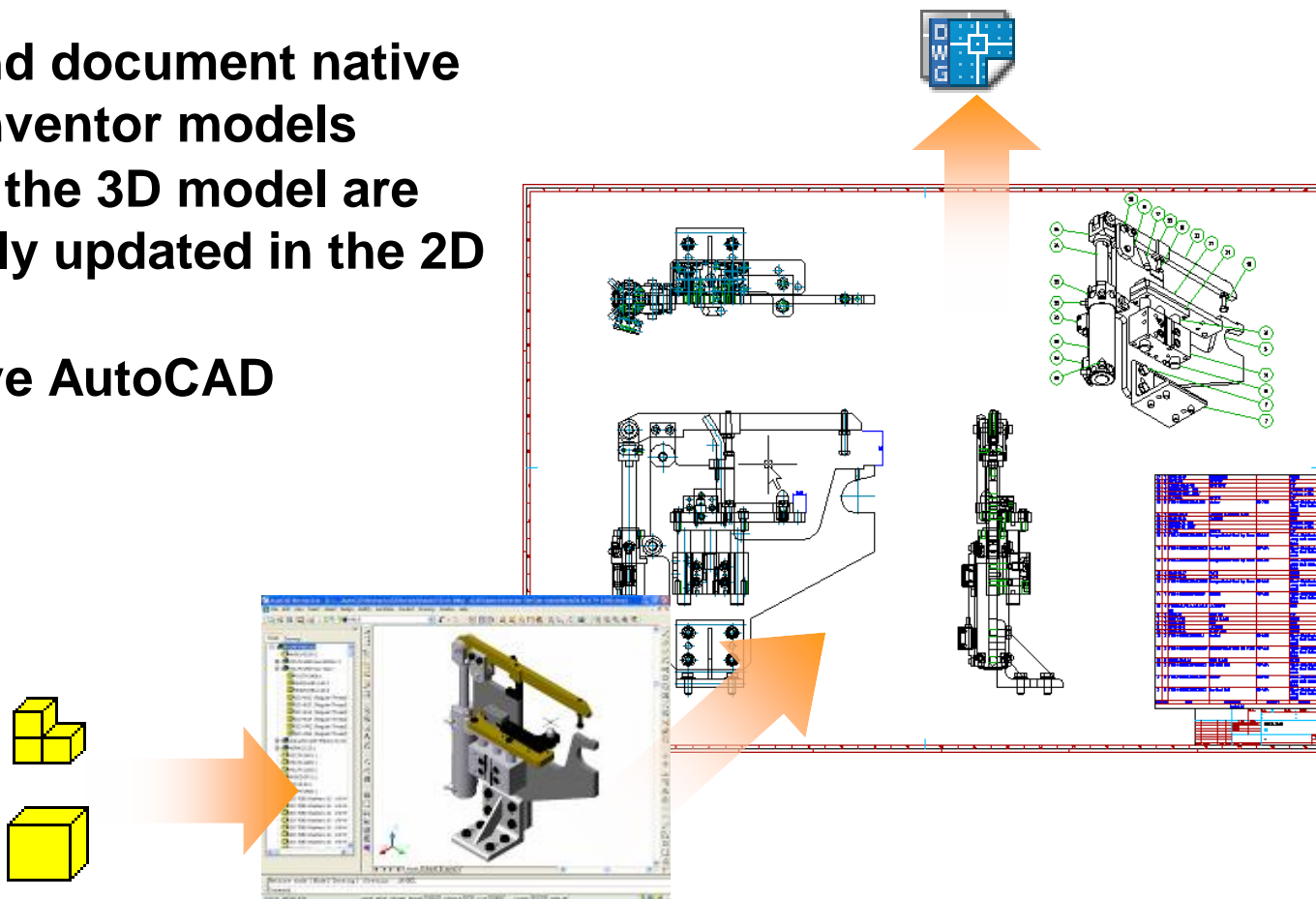


Centralize design storage and improve design reuse

AutoCAD Mechanical Associativity



- Visualize and document native Autodesk Inventor models
- Changes to the 3D model are automatically updated in the 2D drawings
- Create native AutoCAD Mechanical DWG files

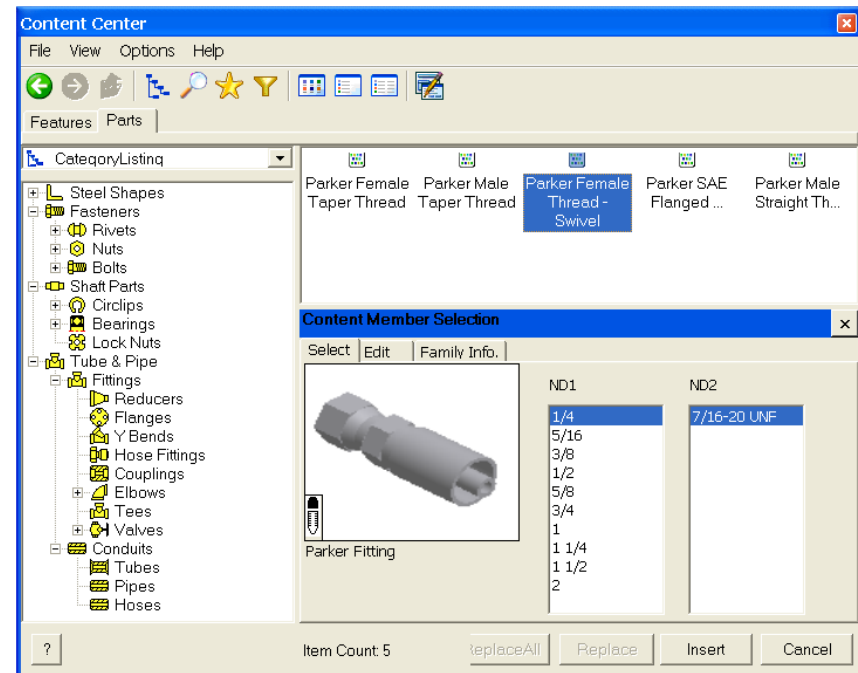


Only Autodesk delivers cross platform 3D to 2D associativity

Content Center



- Author and publish
- Central content repository
- Customized favorites
- Single content library
 - Tube & pipe

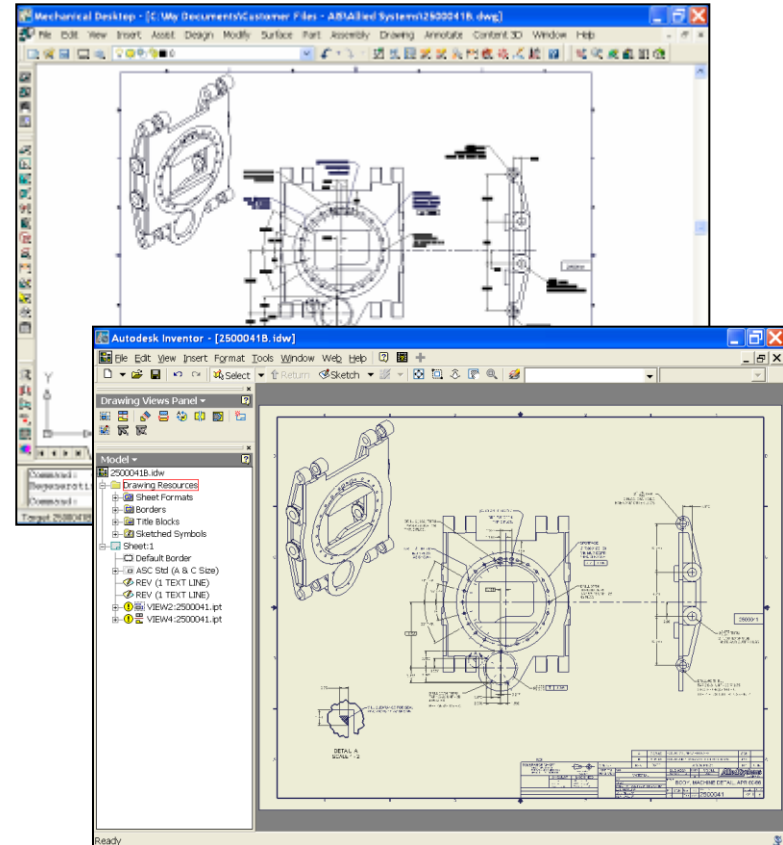


Easy to access the right content when you need it

Enhanced Mechanical Desktop Import



- Re-use models and drawings from Mechanical Desktop
- Maintain original design intent, constraints and drawing relationships
- Automate drawing view creation on import
 - Model to drawing associativity including annotations, scenes and unit settings

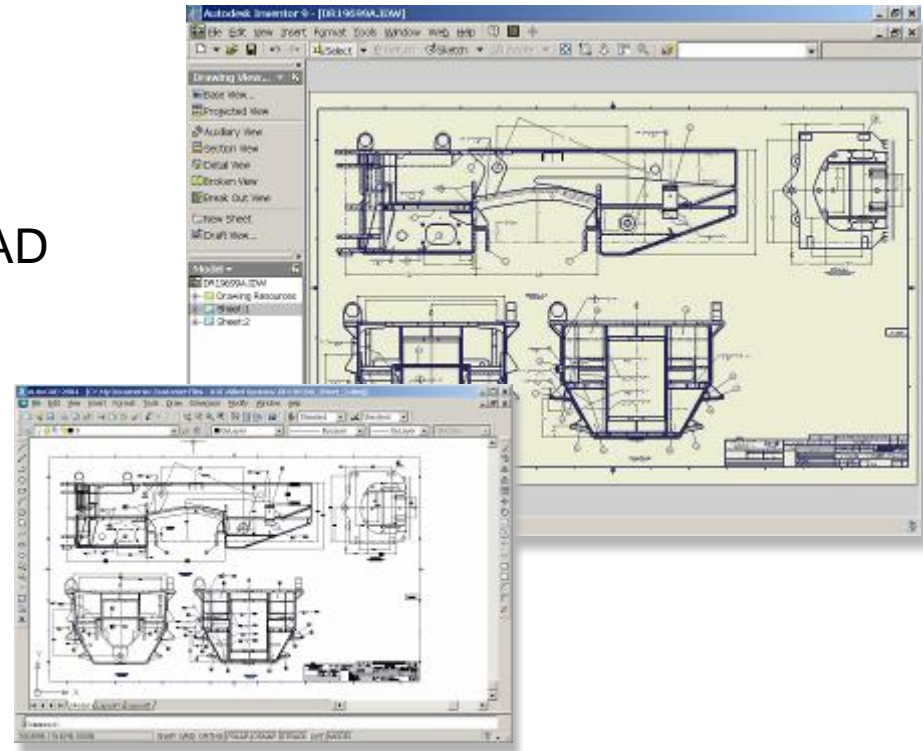


Automate Mechanical Desktop import to Inventor

Industry's Best .DWG Compatibility



- **Import .DWG**
 - Automatic units detection
 - “Constrain end points” option
- **Export to .DWG**
 - Hole/Leader notes as AutoCAD leader objects
- **AutoCAD 2006 ready**

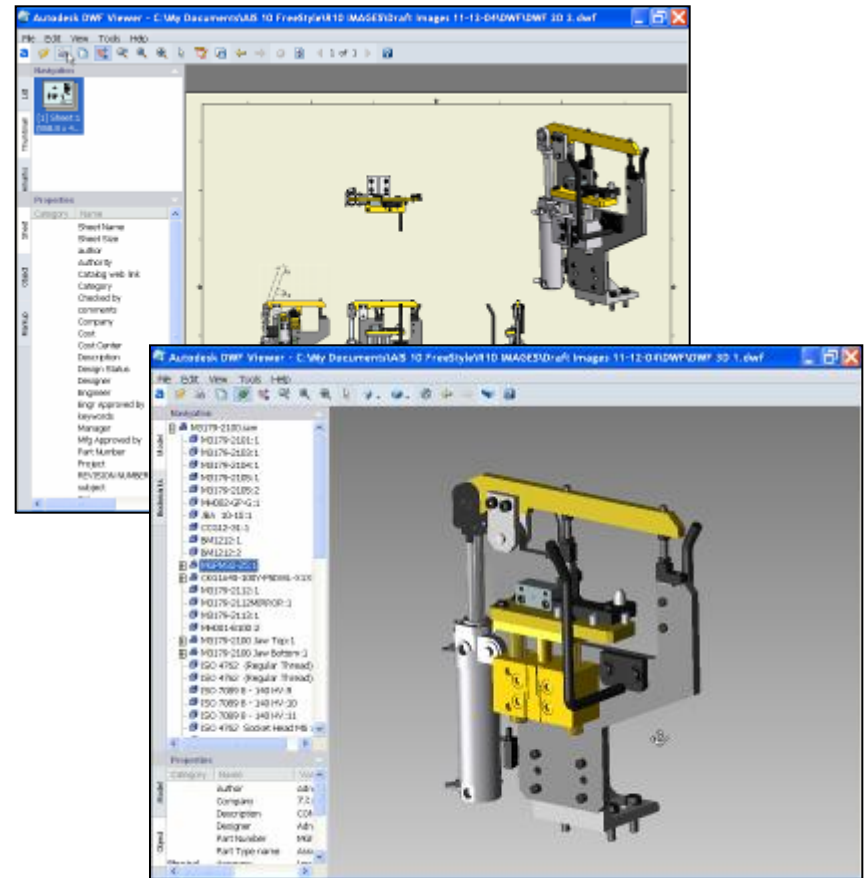


Easy, accurate collaboration and sharing with AutoCAD users

Enhanced DWF



- Publish Presentation files
 - Static exploded views
- Publish 3D wireframe



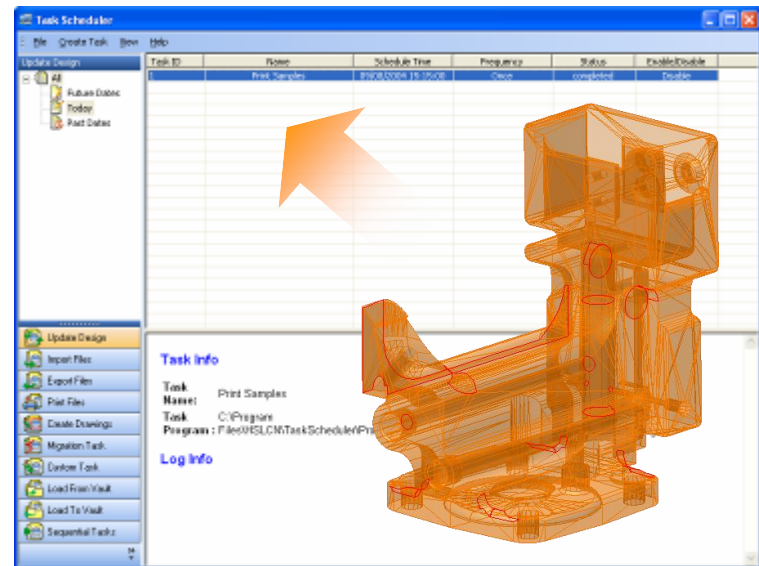
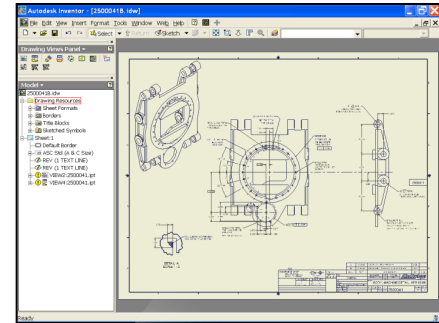
Easily share designs with the extended manufacturing team

Task Scheduler



Schedule single or multiple automated tasks

- AutoCAD, Mechanical Desktop and Inventor file migrations
- Assembly and drawing updates
- Print jobs and DWF publishing
- DWG, IGES and STEP import/export
- User defined tasks



Easily automate repetitive tasks

Autodesk Inventor 10



The power to design the complete product line



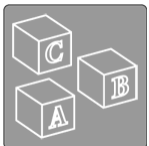
Deliver the design in less time



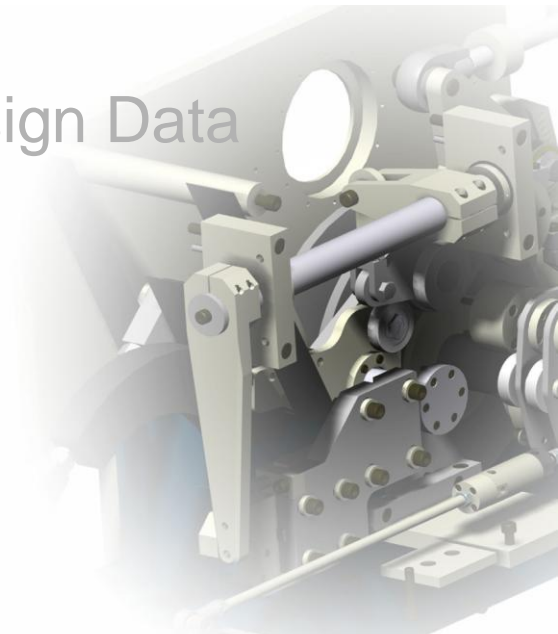
Fastest way to production ready drawings



Communicate and Manage Design Data



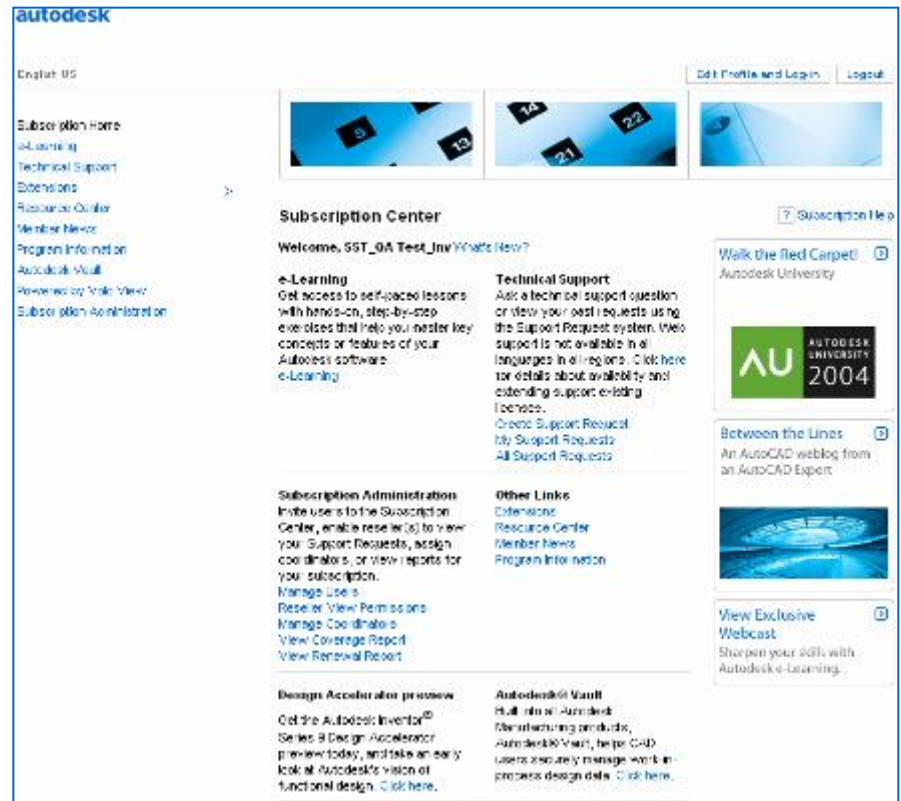
Fastest to learn and deploy



Subscription Aware

Allows Autodesk subscription customers to access subscription services directly through the help menu.

- Extended eLearning
- Support
- Updates



Instant access to up-to-date support and training

Autodesk Inventor 10



- Best-in-class weldments
- Drag-based editing “3D Grips”
- Functional design
- Content Center
- Data re-use and collaboration
- Inventor Studio

