

Plastics made perfect



Validation and optimization of plastic parts

Plastics are now being used to create higher quality and cheaper products and components in nearly every industry. The use of fiber-filled composite materials, and innovative manufacturing methods are answering growing pressures to help reduce cost, weight and time to market. The need for simulation tools that provide deep insight into the plastic injection molding process has never been greater.

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The standard for injection molding simulation

Autodesk[®] Moldflow[®] plastic injection molding simulation software, provides tools that help manufacturers predict, optimize, and validate the design of plastic parts, injection molds, and molding processes. Industry leading companies worldwide use Autodesk[®] Moldflow[®] Adviser and Autodesk[®] Moldflow[®] Insight software to help optimize part and mold designs, reduce potential manufacturing defects, and get innovative products to market faster.

Autodesk Moldflow product line

Autodesk is dedicated to providing a wide range of purpose built injection molding simulation tools to help CAE analysts, designers, engineers, mold makers, and molding professionals create designs of the parts' injection molding process, and bring better products to market at less cost.

Autodesk flexible cloud solving options

The extended solving options of Autodesk[®] Moldflow[®] Insight software allows you to simulate on your local machine, a remote server, or in the cloud, depending on your needs. If you are testing the setup of an analysis, use your local machine to iterate and optimize. When analyses are more computationally intense, or you need some extra compute power to complete a job on time, use the power of the cloud, saving local resources for other tasks.



Part layout simulation

Validate and optimize plastic parts, injection molds, resin selection, and the injection molding process

Plastic flow simulation

Simulate the flow of melted plastic to help optimize plastic part and injection mold designs, reduce potential part defects, and improve the molding process.

Part defects

Determine potential part defects such as weld lines, air traps, and sink marks, then rework designs to help avoid these problems.

Mold filling

Simulate the filling phase of the plastic injection molding process to help predict the flow of melted plastic and fill mold cavities uniformly; avoid short shots; and eliminate, minimize, or reposition weld lines and air traps.



Packing Optimize packing profiles and visualize magnitude and distribution of volumetric shrinkage to help minimize plastic part warpage



Feed system simulation

Model and optimize hot and cold runner systems and gating configurations. Improve part surfaces, minimize part warpage, and reduce cycle times.

Gate location

Identify up to 10 gate locations simultaneously. Minimize injection pressure and exclude specific areas when determining gate location.

Runner design wizard

Create feed systems based on inputs for layout, size, and type of components, such as sprues, runners, and gates.

Balancing runners

Balance runner systems of single-cavity, multicavity, and family mold layouts so parts fill simultaneously, reducing stress levels and improving consistency.

Hot runner systems

Model your entire hot runner system, and set up sequential valve gates to help eliminate weld lines and control the packing phase.



Injection molding process simulation

Mold cooling simulation

Improve cooling system efficiency, minimize part warpage, achieve smooth surfaces, and reduce cycle times.

Cooling system modeling

Analyze a mold's cooling system efficiency. Model cooling circuits, baffles, bubblers, heating elements, and mold inserts and bases.

Cooling system analysis

Optimize mold and cooling circuit designs to help achieve uniform part cooling, minimize cycle times, reduce part warpage, and decrease manufacturing costs. Capture advanced cooling techniques and layouts, such as conformal cooling, induction heating, as well as transient heat calculations. Rapid mold heating technology Use steam heating, heating elements or induction elements to maintain warmer temperatures during filling to achieve high quality part surfaces; reduce temperatures in the packing and cooling phases to help freeze parts and shorten the cycle time.

Shrinkage and warpage simulation

Evaluate plastic part and injection mold designs to help control shrinkage and warpage.

Shrinkage

Meet part tolerances by predicting part shrinkage based on processing parameters and grade-specific material data to determine the optimal mold cavity dimensions.

Warpage

Predict warpage resulting from process-induced stresses. Identify where warpage might occur and optimize part mold design, material choice, and processing parameters to help control part deformation.



Core shift control

Minimize the movement of mold cores by determining ideal processing conditions for injection pressure, packing profile, and gate locations.

Fiber orientation and breakage Control fiber orientation within plastics to help reduce part shrinkage and warpage across the molded part.

CAE data exchange

Validate and optimize mechanical performance of as-manufactured plastic parts using tools to exchange data with mechanical simulation software. Exchange data with Autodesk[®] Simulation Mechanical, Autodesk[®] Nastran[®] and Autodesk[®] Helius PFA software, as well as ANSYS[®], and Abaqus[®] software to predict the real-life structural behavior of plastic parts by using as-manufactured material properties.

Injection molding process simulation

Thermoset flow simulation

Simulate the injection molding of reactive materials, including processes like RIM/SRIM, resin transfer molding, rubber compound injection molding and microchip encapsulation.

Reactive injection molding

Predict how molds will fill with a reactive material, or without fiber-reinforced preforms. Help avoid short shots due to pregelation of resin, and identify air traps and problematic weld lines. Balance runner systems, select molding machine size, and evaluate thermoset materials.

Microchip encapsulation

Simulate encapsulation of semiconductor chips with reactive resins. Predict bonding wire deformation within the cavity and shifting of the lead frame due to pressure imbalances.

Underfill encapsulation

Simulate flip-chip encapsulation to predict material flow in the cavity between the chip and the substrate.



Specialized simulation tools

Solve design challenges with simulation.

Insert overmolding

Run an insert overmolding simulation to help determine the impact of mold inserts on melt flow, cooling rate, and part warpage.



Two-shot sequential overmolding Simulate the two-shot sequential overmolding process: one part is filled; the tool opens and indexes to a new position; and a second part is molded over the first.

Birefringence

Predict optical performance of an injectionmolded plastic part by evaluating refractive index changes that result from process-induced stresses. Evaluate multiple materials, processing conditions, and gate and runner designs to help control birefringence in the part.

Foaming processes

Filling processes that use chemical blowing agents, or that foam using the MuCell® process from Trexel, Inc. and other micro-cellular foaming processes are supported. Predict the cell structure and part weight savings that can be gained. And assess the effect of combining this with a core back process.

Specialized molding processes

Simulate a wide range of plastic injection molding processes and specialized process applications.

Gas-assisted injection molding Determine where to position polymer and gas entrances, how much plastic to inject prior to gas injection, and how to optimize size and placement of gas channels to achieve optimal gas penetration.

Co-injection molding

Visualize the distribution of skin and core materials in the cavity and view the dynamic relationship between the two materials as filling progresses. Optimize material combinations while maximizing the product's cost-performance ratio.



Injection-compression molding Simulate simultaneous or sequential polymer injection and mold compression. Evaluate material candidates, part and mold design, and processing conditions.

Compression molding

Optimize the size and location of charges to be placed in an open mold, before the closing stroke fills the cavity. The simulation can help identify the fiber orientation and the location of weld lines.

CAD interoperability and meshing

Use tools for native CAD model translation and optimization. Autodesk Moldflow provides geometry support for thin-walled parts and thick and solid applications. Select mesh type based on desired simulation accuracy and solution time.

CAD solid models

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Import and mesh solid geometry from Parasolid®based CAD systems, Autodesk® Inventor® and Autodesk[®] Alias[®] software, CATIA[®] V5, Creo[®] Parametric, Pro/ENGINEER[®], Siemens[®] NX[®], Rhino[®], and SolidWorks[®] software, as well as ACIS[®], IGES, JT, STL and STEP universal files.

Autodesk SimStudio Tools

Quickly simplify and edit your geometry for simulation in Moldflow. SimStudio Tools reads in multiple CAD file formats and enables you to quickly simplify models, eliminate unnecessary detail, perform basic repair, or easily make design changes so you can explore various design ideas faster.

Error checking and repair

Scan imported geometry and automatically fix defects that can occur when translating a model from CAD software.

Centerline import/export

Import and export feed system and cooling channel centerlines from and to CAD software, to help decrease modeling time and avoid runner and cooling channel modeling errors.

CADdoctor for Autodesk Simulation

Check, correct, heal, and simplify solid models imported from 3D CAD systems to prepare for simulation.

3D simulations

Perform 3D simulations on complex geometry using a solid, tetrahedral, finite element mesh technique. This approach is ideal for electrical connectors, thick structural components, and geometries with thickness variations.

Dual domain technology

Simulate solid models of thin-walled parts using Dual Domain[™] technology. Work directly from 3D solid CAD models, leading to easier simulation of design iterations.





Midplane meshes

Use midplane meshes to run analyses on thin-walled parts, and run fast and accurate simulations.



Results evaluation and productivity tools

Visualize and evaluate simulation results, and use automatic reporting tools to share the results with stakeholders. Take advantage of features such as a material database and advisers to further boost productivity.

Results interpretation and presentation

Use a wide range of tools for model visualization, results evaluation, and presentation.

Results adviser

Query regions of a model to identify primary causes of short shots and poor part or cooling quality. Get suggestions on how to correct the part, mold, or process.

Photorealistic defect visualization Integration with Autodesk[®] VRED[®] software provides a unique way of visualizing the appearance of defects like sink marks, and the effects of different textures.

Automatic reporting tools

Use the Report Generation wizard to create web-based reports. Prepare and share simulation results more quickly and easily with customers, vendors, and team members. Automate reports using customizable templates.

Microsoft Office export capability Export results and images for use in Microsoft[®] Word reports and PowerPoint[®] presentations.

Autodesk Moldflow Communicator

Collaborate with manufacturing personnel, procurement engineers, suppliers, and external customers using Autodesk® Moldflow®



Communicator software. Use the Moldflow Communicator results viewer to export results from Autodesk Moldflow software so stakeholders can more easily visualize, quantify, and compare simulation results.

Material data

Improve simulation accuracy with precise material data.

Material database

Use the built-in material database of gradespecific information on more than 9,700 plastic materials characterized for use in plastic injection molding simulation.

Manufacturer	Trade cape	Family abbreviation	Filer data Description	Carected work at in-reald stress ICRIMSI model coefficients: All
Could be Dark and Chartoir Contains	MICRO DAGE GET IM	0400	Give Diar	E 500041
Dabhi Park and Florinin Surfaces	FOTOTOL PRT Underd	PRT		05657
Debhy Pack and Electric Systems	POTOET 13 PRT 6E30	PRT	Ginu Fiber	1.276423
Dathly Pack and Floring Surfaces	F0101218 PRT 5633	PRT	filmer Read	0.96316
Dosobu Hannong Chessical Co Ltd	Salamon G129KS	GPPS		0.9964
Depertu Harmone Openical Coll M	Salamon HS181	HPS		125419
Departs I I appropriate Chemical Co. Ltd.	Salawaya MC1E11M	1075		11720
Doephy Harmone Openical Co LM	Salarma HS151Etd	HPS		1.000
Dog Jalon Dangara 114	Process M 1292	100	Tak	0.53931
Dos Ovenical Europe	K5 12100	HDPE		0.51299
Dow Dwniral Furger	Marman 342657	485		0.202152
Dow Chepical Durone	D1E3000.005	00	Tak	LANCE -
Dos Deniral 154	Investor C713-25 FM HP	PPIC00		0.998.2
Dow Ownical USA	DE 563431.00	00	Loop Elect Dire	159072
Dow Ownited USA	P115E200E2	PCv4RS		0.0906
Doe Depical USA	Inchine TET TO	100	Tak	10205
Dos Ovenical USA	Celler 200-8	80		0.2021
Da Pard Dava Flastream	Laper 8002/Ecours 3411 88/20 Flood	core .		15030
Dr. Pard Engineering Driveren	7 AM NUTHER CALCULAR INCOME.	000		0.73030
De Part Franceiro Polonero	Ziau HTNERS2R30NH MC000	PPa	film: Film	12051
Di End Ecologiani Dilument	Ziad MTN54G154G1 D NCT10	229	Gian Day	E 1929B
DurPard Engineering Polymers	Forder RES/84 NO211	139	Size Film	1943
Di Enri Ecologiani Dilument	Earche EF 2020 EX 201	DEL.		8 15050
Du Part Engineering Polymers	Ziani HTNER\$3650NH WSE 8K322	P0.	Gen Ehr	10203
Da Part Formering Diamer	Hand 7245	199		01557
DuPart Engineering Polymers	Haw 9403	TPS		12575
DePort Franceiro Polaren Moldi	Dante SELENCIED	PRI		0.47419
Di Part Engineering Drivnen Bitchill	Course SOCIA NOTE	097	Giau Basel	150500
5 DuPant Engineering Palviners (Mold) .	Crastic SD653 NCI11	PRT	Glass Bead	19052

Autodesk Moldflow Plastics Labs Get plastic material testing services, expert datafitting services, and extensive material databases with Autodesk[®] Moldflow[®] Plastics Labs.

Productivity tools

Use advisers and extensive help to boost productivity.

Cost adviser

Learn what drives part costs to help minimize those costs. Estimate product costs based on material choice, cycle time, post-molding operations, and fixed costs.

Design adviser

Quickly identify areas of plastic parts that violate design guidelines related to the injection molding process.

Help

Get help on a results plot, including information on what to look for and how to correct typical problems. Learn more about solver theory, interpreting simulation results, and designing better plastic parts and injection molds.

Automation and customization

Automate common tasks and customize Autodesk Moldflow software for your organization.

API tools

Application programming interface (API) tools enable you to automate common tasks, customize the user interface, work with thirdparty applications, and help implement corporate standards and best practices.



Autodesk® Moldflow® 2017 feature comparison

Feature comparison matrix

Validate and optimize plastic parts, injection molds, resin selection, and the injection molding process using Autodesk® Moldflow®. Compare the features of Autodesk Moldflow products to learn how Autodesk® Moldflow® Design, Autodesk® Moldflow® Adviser and Autodesk® Moldflow® Insight software can help meet the needs of your organization.

		Moldflow Adviser			Moldflow Insight		
	Moldflow Design	Standard	Premium	Ultimate	Standard	Premium	Ultimate
SOLVER CAPACITY							
Simultaneous local solving (max)	Unlimited	Unlimited	Unlimited	Unlimited	1	3	3
Cloud Solving					×	×	×
MESHING							
Dual Domain		× .	×	×	×	× .	×
3D			× .	×	×	×	× .
Midplane					×	×	× .
CAD INTEROPERABILITY							
CAD Solid Models	×	× .	× .	× .	× .	× .	× .
Parts	×	× .	× .	× .	×	×	× .
Assemblies					×	×	× .
SIMULATION ADVISERS							
Design advice	×						
Design adviser		×	×	×			
Results adviser		×	×	×			
Cost adviser		× .	× .	× .			

		Moldflow Adviser			Moldflow Insight		
	Moldflow Design	Standard	Premium	Ultimate	Standard	Premium	Ultimate
SIMULATION CAPABILITIES							
Filling	×	V	×	V	×	-	×
Packing				V	×	V	× .
Fiber orientation				×	×	× .	× .
Sink marks and weld lines	×	V	V	-	V	V	V
Molding window		~	×	~	V	-	V
Venting analysis					×	× .	×
Crystallization analysis						-	V
Gate location		V	×	V	×	V	× .
Cold & hot runners			×	V	V	V	V
Runner balancing			×	V	×	V	V
Design of experiments (DOE)						-	V
Cooling				×	× .	× .	× .
Transient mold cooling or heating					×	×	×
Conformal cooling						×	×
Rapid temperature cycling						× .	× .
Induction heating						~	×
Heating elements					×	V	× .
Warpage				V	V	V	V
Insert overmolding					V	V	v .
In-mold label					×	V	× .
Two-shot sequential overmolding					V	-	×
Core shift						-	×
Wire sweep, paddle shift						×	×

Autodesk[®] Moldflow[®] 2017 feature comparison Feature comparison matrix

Validate and optimize plastic parts, injection molds, resin selection, and the injection molding process using Autodesk® Moldflow®. Compare the features of Autodesk Moldflow products to learn how Autodesk® Moldflow® Design, Autodesk® Moldflow® Adviser and Autodesk® Moldflow® Insight software can help meet the needs of your organization.

		Moldflow Adviser			Moldflow Insight		
	Moldflow Design	Standard	Premium	Ultimate	Standard	Premium	Ultimate
MOLDING PROCESSES							
Thermoplastic injection molding	×	~	×	-	×	-	V
Gas-assisted injection molding							V
Injection-compression molding							×
Co-injection molding							×
Bi-injection molding							×
Chemical Blowing Agent (CBA)							×
Microcellular injection molding with and without core back							×
Birefringence							V
Resin transfer (RTM) and structural reaction injection molding (SRIM)					×	×	×
Rubber, liquid silicone injection molding					×	×	×
Multiple-barrel reactive molding					×	×	×
Reaction injection molding					×	× .	×
Microchip encapsulation						× .	×
Underfill encapsulation						×	× .
Compression molding							~
DATABASES							
Thermoplastic materials*	 Image: A set of the set of the	~	×	v	×	~	×
Thermoset materials					×	v	×
Molding machines					×	× -	×
Coolant materials				×	×	× .	×
Mold materials				V	×	×	×

*Limited database

		Moldflow Adviser			Moldflow Insight		
	Moldflow Design	Standard	Premium	Ultimate	Standard	Premium	Ultimate
SOFTWARE INTEROPERABILITY							
Autodesk Helius PFA (Advanced Material Exchange)					×	×	× .
Simulation Mechanical (FEA)					×	×	×
Autodesk Nastran (FEA)					×	×	×
Abaqus (FEA)					×	×	×
ANSYS (FEA)					× .	× .	×
LS-DYNA (FEA)					V	×	×
CODE V (Birefringence)							×
VRED (defect visualization)		× .	v .	v .	v .	× .	×
Showcase (defect visualization)		×	×	×	×	×	 Image: A start of the start of
CADdoctor for Autodesk Simulation		×	×	V	 Image: A second s	×	V
SUPPORTED LANGUAGES							
English	×	×	×	×	×	×	
Chinese (Simplified)	 Image: A set of the set of the	×	× .	×	×	×	 Image: A set of the set of the
Chinese (Traditional)		×	×	×	×	×	 Image: A start of the start of
French		×	×	×	×	×	 Image: A second s
German	×	×	×	V	×	×	×
Italian		×	×	×	×	×	×
Japanese	×	×	×	×	×	×	×
Portuguese		× .	V	v .	v .	× .	×
Spanish		×	×	×	×	×	 Image: A second s
Korean		V	×	×	×	V	V
INCLUDED SOFTWARE & SERVICES							
Moldflow Communicator		× .	× .	×	×	×	× .
SimStudio Tools		× .	×	× .	×	× .	× .
Vault		× .	V	× -	× -	× -	× -

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