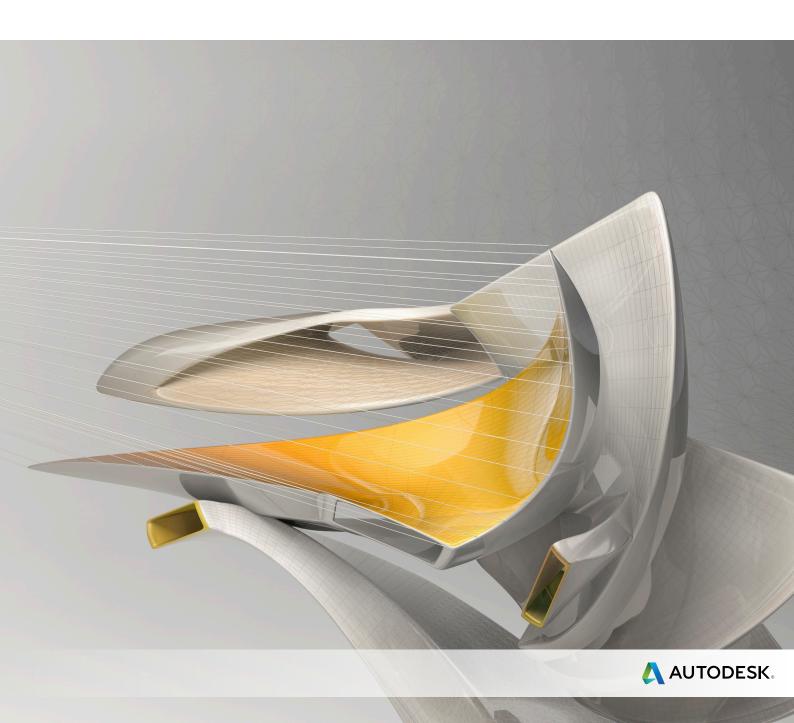


Plastics made perfect



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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Injection molding process simulation	4
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The standard for injection molding simulation

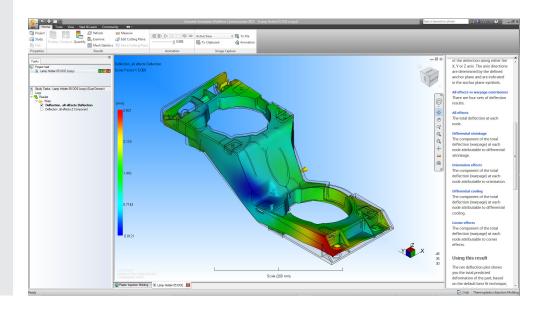
Autodesk[®] Moldflow[®] plastic injection molding simulation software, provides tools that help manufacturers predict, optimize, and validate the design of plastic parts, injection molds, and molding processes. Industry leading companies worldwide use Autodesk[®] Moldflow[®] Adviser and Autodesk[®] Moldflow[®] 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

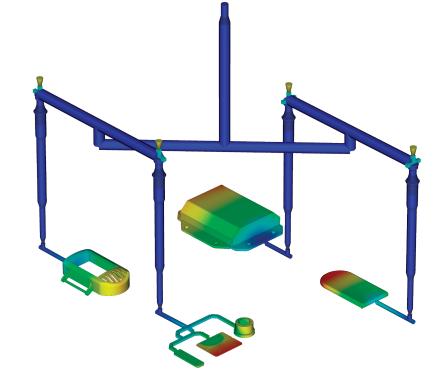
Determine potential part defects such as weld lines, air traps, and sink marks, then rework designs to help avoid these problems.

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

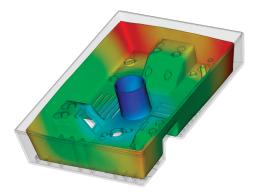
Evaluate plastic part and injection mold designs to help control shrinkage and warpage.

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

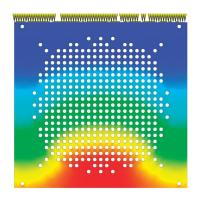
Predict how molds will fill with a reactive material, or without fiber-reinforced preforms. Help avoid short shots due to pregelation of resin, and identify air traps and problematic weld lines. Balance runner systems, select molding machine size, and evaluate thermoset materials.

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.

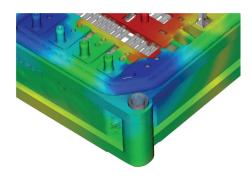


Specialized simulation tools

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.

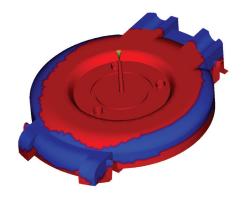
Specialized molding processes

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

8.00

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

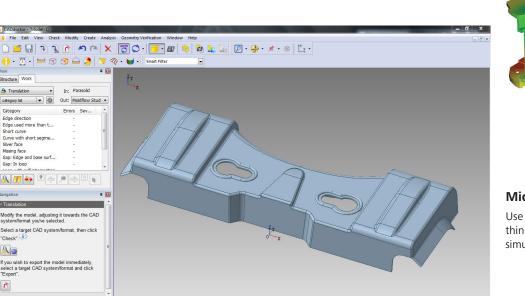
Check, correct, heal, and simplify solid models imported from 3D CAD systems to prepare for simulation.

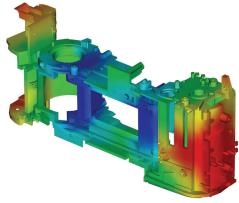
3D simulations

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

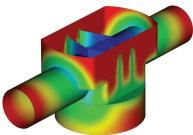
Simulate solid models of thin-walled parts using Dual Domain[™] technology. Work directly from 3D solid CAD models, leading to easier simulation of design iterations.





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.

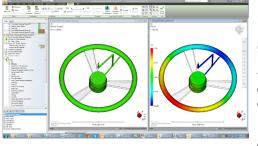
Automatic reporting tools

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.

l Th	emoplastica material (System)						•]0
	Manufacturer	Trade name	Family abbreviation	Filler data Description	Carected socidual in-	nald stress (CRIMS) model oo	eticent: Al	
68	Debhi Packard Flexibi: Sustema	M #R83 PAGE GE7 IM	P066	Give Film			0.558941	
83	Debh Pack and Electric Systems	POTOETOB PST United	PBT				0.54553	
30	Debhi Packad Electric Systems	R0100113 PRT 6E30	PRT	Give Fiber			0.274423	
21	Debhi Packard Electric Systems	P0100215 P8T 6833	P91	Giam Bead			0.361182	
172	Dosobul Hannong Oversical Col Ltd	Salamone G129KS	GPPS				0.99644	
73	Dongty Harmong Chemical Co Ltd	Salarene HS181	HPS				8,754193	
14	Dosobul Hannong Chemical Co Ltd	Splanne HS151LH	HPS				1.12261	
75	Dongto Hannong Chemical Co Ltd	Salarene HS161[04	HPS				0326699	
371	Dos Won Campany Ltd	Procest M 1252	77	Telc			0.536514	4
77	Dow Ovenical Europe	KS 10100	HDPE				0.612308	
178	Dow Chemical Europe	Magnum 34165C	A85				0.707151	
179	Dow Chenical Europe	D1F3980.085	pp	Taki			0.424377	
80	Dow Ovenical USA	Impire C719-35 FM HP	PP(C0)				0.599128	
a1	Dow Ownical USA	DL5F3411.00	PP .	Long Elecs Fiber			0.501728	
82	Dow Ovenical USA	PULSE 200EZ	PC+485				0.08067	
83	Dow Ownical USA	Inspire TF1301	170	Tak			0.625058	
194	Dow Ovenical USA	Calbre 200-8	PC PC				E 709117	
	DuPort Dov Electories	Topaz 8007/Engage 8411 88/20 Elend	COC				0.542948	
	DuPart Engineering Polymers	2 AN HTNSTENSETHS NOTE	PPA.				8 728353	
87	DuPont Engineering Polymers	Zytel HTNFR52630NH MC010	PPA	Gian Fiber			E 200519	
	DuPart Engineering Polymers	2)MI HTN54G15HSLR NCELD	PPA.	Glass Fiber			£197368	
	DuPont Engineering Polymers	Pyrite RE5264 N0010	PET	Gian Fiber			0.954256	
290	DuPort Engineering Polyners	Figure FIE:3070 14:507	PET				£157596	
191	DuPont Engineering Polymers	Zytel HTNFR\$3650NHUV/SF 8K337	FA.	Gian Fiber			1.02034	
	Duffont Engineering Polymers	Hytel 7246	175				0.15533	
83	DuPart Engineering Polymers	Hutel 9483	TPE				0.357762	
194	DuPont Engineering Polymers (Hold) .	Depter 5810 NO010	PBT				0.464199	
10	ExPant Engineering Palvmens Pholds.	Cause SD653 NC810	PRT	Giau Bead			£ 505263	
				Carpare	pot. Expot.	Detals. Seath.	Calum	ŝ
						Select Cancel	Help	

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

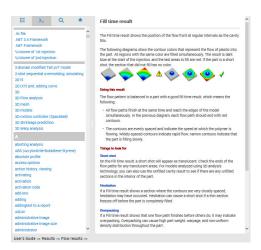
Get help on a results plot, including information on what to look for and how to correct typical problems. Learn more about solver theory, interpreting simulation results, and designing better plastic parts and injection molds.

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		
	Premium	Ultimate	Standard	Premium	Ultimate
SOLVER CAPACITY					
Simultaneous local solving (max)	Unlimited	Unlimited	1	3	3
Cloud Solving			×	×	×
MESHING					
Dual Domain	×		×		×
3D	×		V	V	×
Midplane			×	×	¥
CAD INTEROPERABILITY					
CAD Solid Models	×	×	×	×	× .
Parts	×		V		 Image: A second s
Assemblies			×	¥	V
SIMULATION ADVISERS					
Design advice	×	×			
Design adviser	×	V			
Results adviser	V	×			
Cost adviser	V				

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

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

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

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