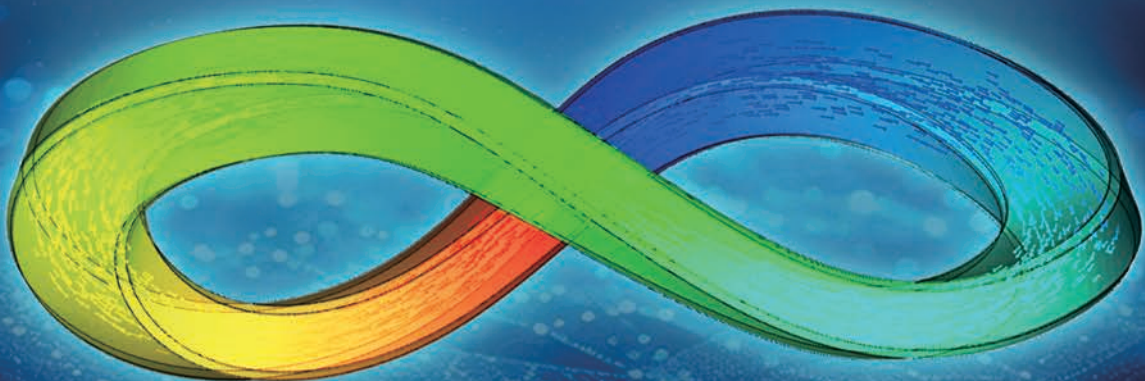# Moldex3D

Molding Intelligence

Leadership In True 3D CAE Technology

Key to Your Core Competitiveness

Cost Saving for Your Business

Moldex3D's leading true-3D molding simulation can be applied in a wide range of plastic molding processes. It predicts potential manufacturing defects, validates part/mold design, lowers mold development costs, evaluates manufacturability, shortens time-to-market, and greatly increases business value.
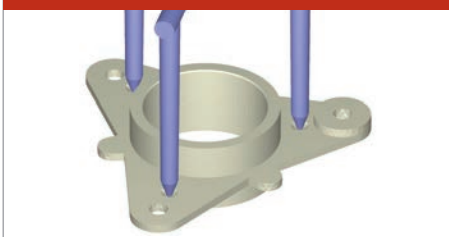
· Shorten cycle time and time-to-market
· Reduce number of mold trials and manufacturing costs
· Increase revenue and ROI
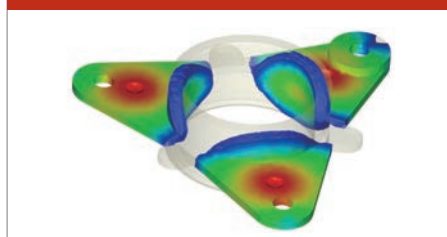· Minimize product defects and extend mold life
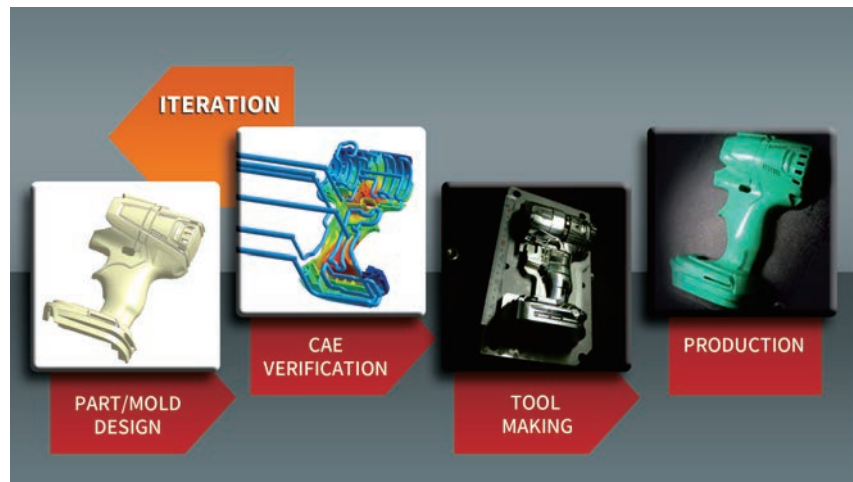
Optimize Part/Mold Design Process

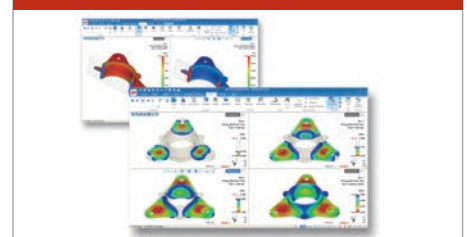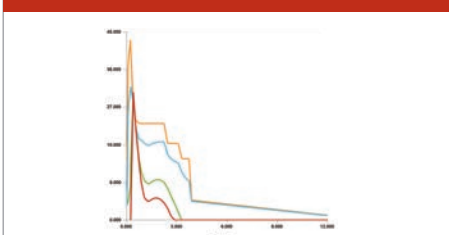## Intuitive User Interface to Streamline Simulation Workflows

Mold Design Validation

Powerful Simulation
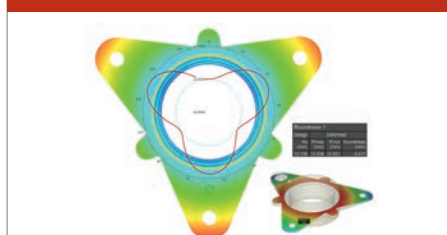

Convenient Result Display

Variety of XY Plot

Measurement & Inspection Tools

Customized Report

# Validate and Optimize with Plastics Injection Molding Simulation

Moldex3D is the world-leading CAE product for the plastic injection molding industry. With the best-in-class analysis technology, Moldex3D can help you carry out in-depth simulation of the most extensive range of injection molding processes and optimize product designs and manufacturability.

Issue Diagnosis for Your Product

Predict upfront most of the common manufacturing problems, such as short shot, flow imbalance, air trap, or hesitation. It greatly improves part quality, structure, and appearance.
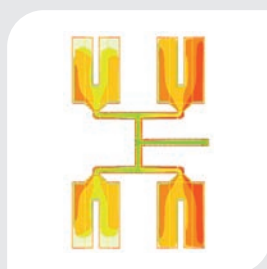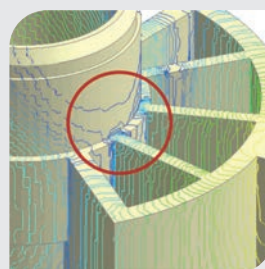
Weld Line	Flow Imbalance	Air Trap	Hesitation	Short Shot
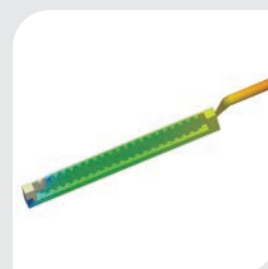
Flow

· Predict melt front and flow pattern.
· Optimize gating locations and design.
· Diagnose common manufacturing issues (weld line, flow imbalance, air trap, short shot, etc.).

Pack

· Evaluate gate-freeze time.
· Avoid sink mark or flash.
· Optimize packing profile.

Cool

· Improve cooling efficiency.
· Reduce cycle time.
· Predict hot spots.
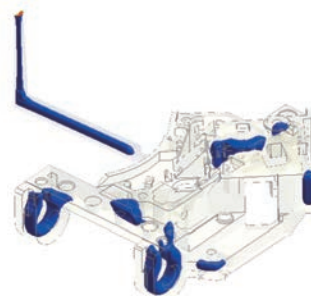
Warp

· Predict final part shape.
· Identify warpage causes.
· Perform nonlinear analysis for large deformation.
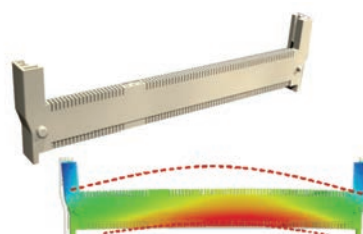
Cooling System Design and Thermal Management

Transient Cool

· Support various dynamic variotherm technologies, including Heat & Cool™, Induction Heating Molding (IHM), Electricity Heating Mold (E-Mold), etc.
· Utilize rapid temperature-changing molding process to increase melt fluidity in the filling stage.

Advanced Hot Runner (AHR)

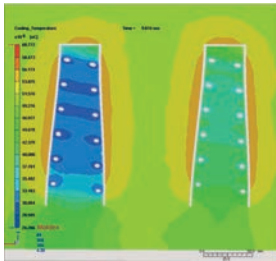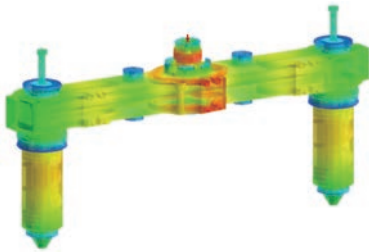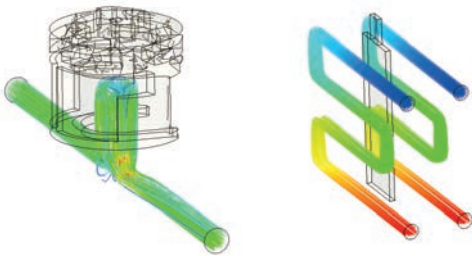· Visualize temperature distributions over time in hot runners and moldbase.
· Predict problems, such as non-uniform melt temperature, unbalanced filling, etc.
· Support quick, steady analysis for complex hot runner layout design.
· Support pin movement control simulation by flow front location.

3D Coolant CFD

· Simulate coolant flow in 3D cooling channels to guarantee cooling efficiency.
· Visualize the streamline direction and predict dead spot.
· Optimize cooling system design and achieve cycle time reduction.
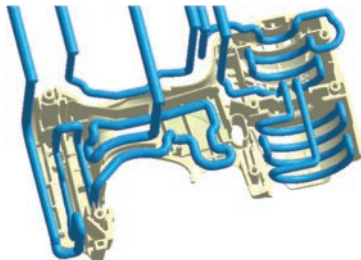
Conformal Cooling

· Allow conformal cooling modeling with the combination of different line and geometry defined components.
· Provide wizard interface for a fast and intuitive workflow to build complex cooling system.

Multiple-Material Product and Design

Multi-Component Molding (MCM)

· Simulate Insert and Sequential Shot Molding.
· Detect potential re-melt issue.
· Predict warpage and cooling with different materials.
· Evaluate the impact by thermal and fiber condition in insert component from another shot.
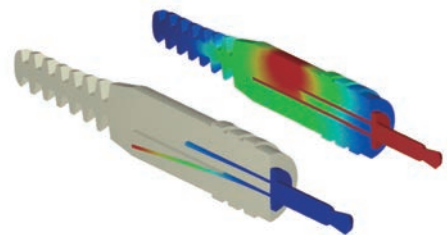
In-Mold Decoration (IMD)

· Enable easy IMD film modeling workflow with minimum human effort.
· Provide wash-out index to better predict the wash-off ink decoration of the film.
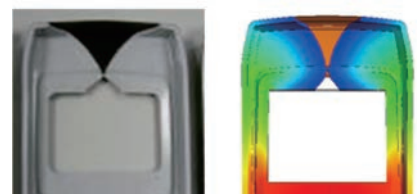
Plastic Molding Simulation Transformation

Stress

· Predict stress and displacement distributions of parts and part inserts.
· Evaluate displacements of plastics under certain external loadings.
· Support FSI (Fluid-structure interaction) calculation.
· Predict annealing with Viscoelasticity module.
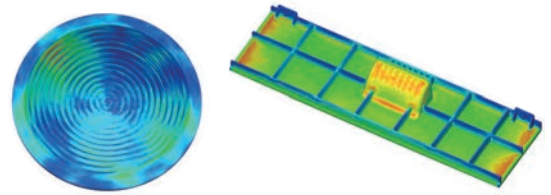
Viscoelasticity (VE)

· Analyze the viscous and elastic properties of polymeric materials.
· Calculate flow-induced residual stress, warpage, and optical properties (with Optics module).
· Observe advanced flow-fiber induced special molding phenomenon.

Optics

· Predict flow- or thermally-induced birefringence, retardation, fringed orders, and fringed patterns.
· Integrate with CODE V by providing non-uniform refractive index prediction and deformed shape.
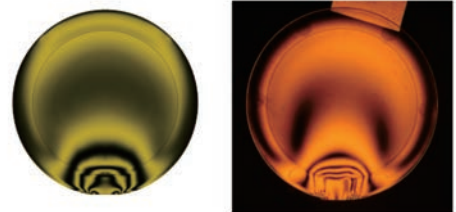
Barrel

· Barrel compression simulation with 3D screw movement to better predict melt inlet conditions such as temperature and pressure.
· Analyze melt behaviors induced by machine response through Moldex3D machine characterization service.
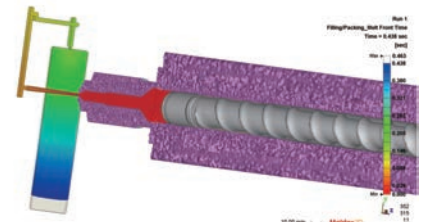
Advancing Material Simulation
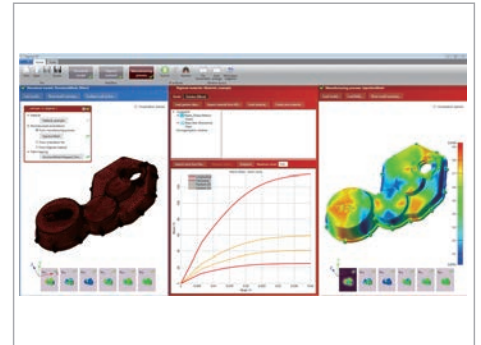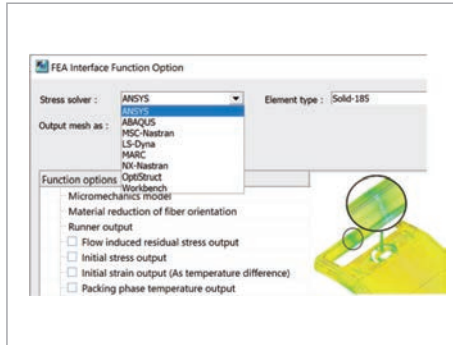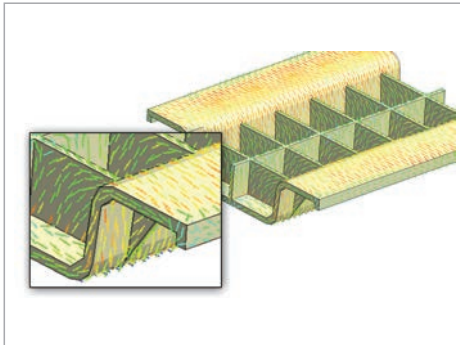
Fiber

- Visualize fiber orientation, length, and concentration inside fiber-reinforced plastics.
- Evaluate the filler effect to mechanical properties and final shrinkage.
- Optimize process conditions to enhance the part strength.
- Support short, long, flat fiber, and flake orientation simulation.

FEA/Micromechanics Interface

- Export fiber orientation, material anisotropy, residual stresses, weldline strength and molding pressure to structural software.
- Validate the structural performance of products and mold sustainability.

Moldex3D Digimat-MS

- Bridge manufacturing process and FEA analysis.
- Predict the mechanical behaviors with nonlinear material modeling technology for reinforced plastic.
- Define material properties and criteria of failure properties for reinforced plastic.
- Support automatic reverse engineering for material model generation based on experiment data.
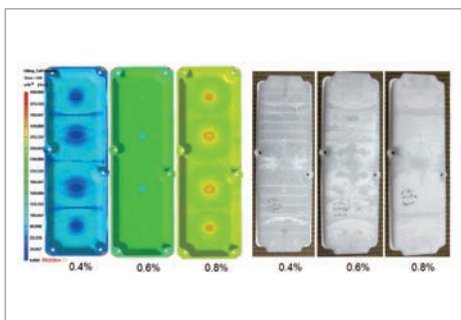
Foam Injection Molding (FIM)

- Visualize the filling behavior of the polymer-gas solution into the cavity.
- Visualize bubble density and size considering the bubble nucleation and growth.
- Evaluate the surface quality, weight reduction, tonnage reduction, shrinkage reduction, etc.
- Support CBA material simulation as an initial gas concentration option for thermoplastic analysis.

Chemical Foaming Molding (CFM)

- Provide foaming kinetics for different by-products in chemical foaming process.
- Optimize for a desired volume-to-weight ratio of the product.

Special Molding Process

Reaction Injection Molding (RIM)

- Simulate thermoset injection molding.
- Simulate cavity filling, curing, part warpage, fiber orientation, multi-component molding, etc.

Co-Injection Molding (CoIM)
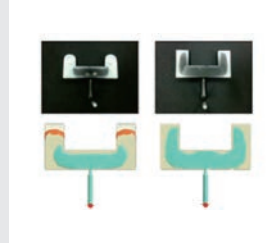
- Visualize the flow behaviors of skin and core materials.
- Optimize geometry thickness and process conditions based on core breakthrough prediction.
- Consider temperature imbalance and pressure resistance variations of skin layer and center core.
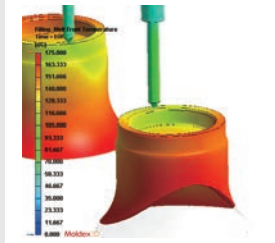
Bi-Injection Molding (BiIM)
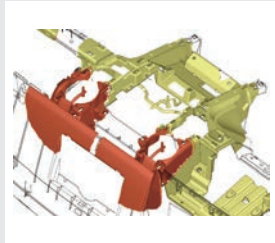
- Define independent melt entrances and filling/packing parameters for different materials.
- Visualize the melt front time for each melt entrance in the filling stage.
- Predict weld line through melt front advancement.

Gas/Water-Assisted Injection Molding (GAIM/WAIM)

- Specify the gas/fluid injected from single or multiple gas entrances or from the melt entrance.
- Optimize gas/fluid channel designs and locations of gas/fluid entrances.
- Visualize the skin thickness and core-out ratio distributions and predict corner effect and blow through.

Compression Molding (CM)
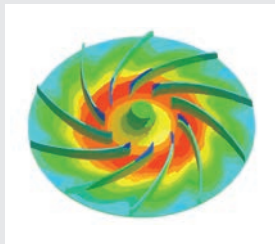
- Visualize pressure distribution, volume shrinkage, residual stress distribution, fiber orientation, etc.
- Predict potential molding defects, such as flashing.

Injection Compression Molding (ICM)
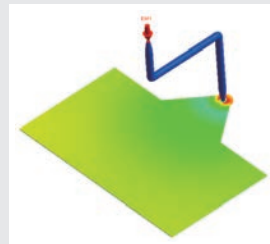
- Visualize property changes in the compression molding process over time.
- Calculate residual stress and evaluate process designs.

Powder Injection Molding (PIM)

- Visualize flow behaviors of the feedstock.
- Predict black line due to phase separation of powder and binder (non-uniform powder concentration).

High-Performance Computing (HPC)
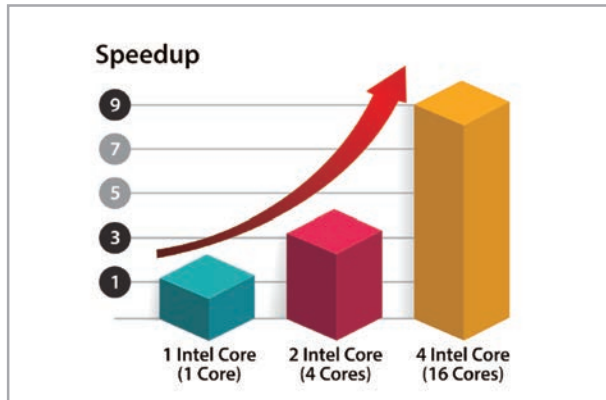
Parallel Processing (PP)

- Speed up analysis with options of utilizing the strength of multicore, multi-CPU, and multi-PC cluster.
- Supports the Linux solver, assists users to build a low-cost and high-efficiency computing platform.

Cloud Computing

- Moldex3D and third-party computing manager and job scheduler to fully apply computing resource.
- A variety accessory tools for developing private and public cloud server based on different IT and usage conditions.
- Linux solver supported for common OS distribution to optimize computation performance.

Smart Design & Manufacturing

SYNC

- Integrated simulation user interface and workflow in CAD environment with PTC®Creo®, NX, and SOLIDWORKS®.
- A variety of design and integration tools for different targets on CAE modeling and optimization analysis.
- Quick design change and validation for part designers in familiar CAD/CAM environments.

Expert (DOE)

- Optimization tools such as DOE task to manage analysis variation and provide graphical summaries automatically.
- Evaluate the optimal process conditions, such as injection velocity, packing time, cooling time, or mold temperature.
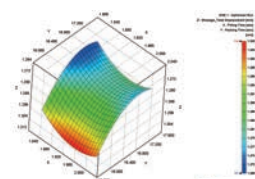
API

- Automatic workflow for massive pre/post-processing and project setting operation.
- User-defined function established for a customized and integrated user scenario.

Boost Work Efficiency in Pre-processing
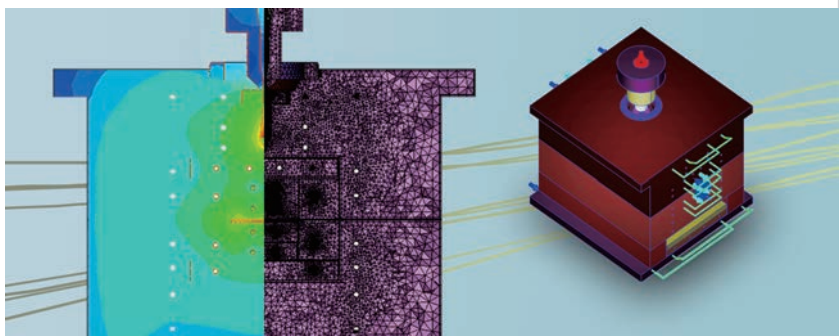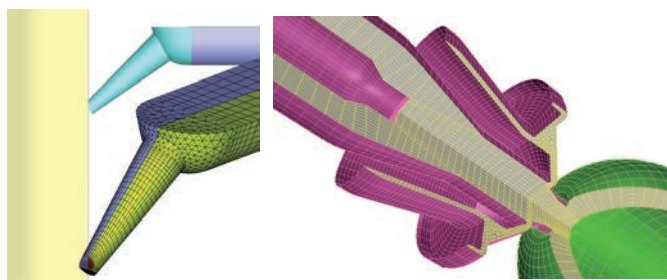
High Resolution 3D Mesh Technology (BLM)

- · Enable automatic mesh generation, especially for complicated 3D geometry, with less complex and faster workflow.
- · Mixed type to construct runner system with combination of curve and geometry runner/gate.
- · Support non-matching technology for part insert and moldbase.
- · Support tetra elements and Boundary Layer Mesh (BLM).

Hybrid Structure Mesh Technology

- · Manual workflow for customized and optimized structure mesh resolution and distribution.
- · Support 3D Tetra, Hexahedral, Prism, Pyramid, and 2.5D Shell elements.
- · A variety of meshing tools provided on both Studio and Rhino integrated platform.

Auto 3D Meshing Engine (eDesign)

- · Support auto mesh generation for saving time and variant level of mesh generation with intelligent wizards.

Integrated Geometry Healing Tool

Moldex3D CADdoctor

- · Enable multi-CAD data exchange between Moldex3D preprocessing and multi-CAD platform.
- · Fix the defects of part and simplify the complicated geometry structure with high-quality surfaces and entities for better BLM generation.
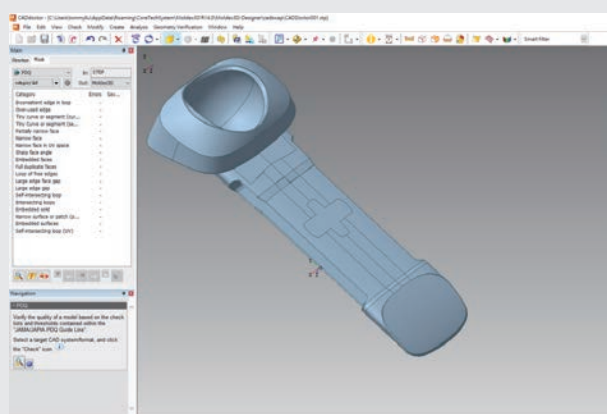
Product Portfolio and Features

Standard Injection Molding

● Essential features contained │ ○ Optional features

	Standard	eDesign Plus	Professional	AEP
Solver Capabilities				
Simultaneous Analysis (max.)	1	1	1	3
Parallel Processing (PP)	8	8	8	24
Material Database [1]	●	●	●	●
Thermoplastic Injection Molding (IM)	●	●	●	●
Reaction Injection Molding (RIM)	●	●	●	●
Cloud-Connect	○	○	○	○
Shell Analysis	○		○	●
Simulation Capabilities				
Filling	●	●	●	●
Surface Defect Prediction	●	●	●	●
Venting Design	●	●	●	●
Gate Design	●	●	●	●
Cold & Hot Runners	●	●	●	●
Runner Balancing	●	●	●	●
Insert Molding	●	●	●	●
Multi-shot Sequential Molding		●	●	●
Packing		●	●	●
Cooling		●	●	●
Transient Mold Cooling or Heating		●	●	●
Conformal Cooling		●	●	●
3D Coolant CFD		○	●	●
Rapid Temperature Cycling		●	●	●
Induction Heating		●	●	●
Heating Elements		●	●	●
Warpage		●	●	●
CAD Interoperability & Mesh Technology				
CAD Geometry Model [2]	●	●	●	●
eDesign	●	●	●	●
Boundary Layer Mesh (BLM)	●		●	●
Hybrid (Tetra, Hexa, Prism, Pyramid)			○	●
Shell (2.5D Mesh)			○	●
Moldiverse				
Material Hub Cloud (MHC) [3] (1year Subscription)	1	1	1	3
University - Software Training Course (IM)-Lesson 1&2 [4] (1year Subscription)	1	1	1	3

System Requirements

Platform	Windows	Windows 10, Windows 11, Windows Server 2019, Windows Server 2022
	Linux	Rocky Linux 8.10 and higher, Rocky Linux 9.4 and higher
Hardware	Minimum	
	CPU	CPU speed 2 Ghz
	RAM	Main memory 16 GB
	HDD	20GB free disk space (at least 2 GB for installation)
	Recommended	
	CPU	AMD EPYC™ Milan / Milan-X series, Intel® XEON® Gold / Platinum / Bronze series
	RAM	16GB x 8 With ECC / 3200Mhz
	HDD	4 TB SSD (For Project Management)
	Graphic Card	OpenGL 4.3 or higher, 512 MB or larger DRAM graphic cards
	Screen Resolution	1920 x 1080

Note
1. Linux platform is used for calculation resource only. Moldex3D Pre/Post-processor does not support Linux platform.
2. To increase calculation efficiency and stability, it is recommended to switch off Hyper-Threading under RC/DMP structure. For the 12th Gen Intel® Core™ processors, only performance cores are used in default. For memory population rules, please refer to your CPU processor type for optimized performance.

Solution Add-on

● Essential features contained | ○ Optional features

	Standard	eDesign Plus	Professional	AEP	Add-on Suites (Subscription Only)	
					Premium Suite	Ultimate Suite
Automation & Interoperability						
Expert (DOE)		○	○	1	●	
API	○	○	○	1	●	
SYNC [5]	○	○	○	○		
Moldex3D CADdoctor	○	○	○	○		
Cooling Channel Designer		○	○	○	●	
iSLM [6]	○	○	○	○	●	
Fiber Reinforced Plastics						
Fiber	○	○	○	●	●	
Enhanced Fiber [7]	○	○	○	○		
FEA Interface [8]	○	○	○	○	●	
Micromechanics Interface [9]	○	○	○	○	●	
Moldex3D Digimat-MS	○	○	○	○		
Advanced Analysis						
Machine Response [10]	○	○	○	○	●	
Stress		○	○	○	●	
Viscoelasticity (VE)		○	○	○		●
Advanced Hot Runner (AHR)		○	○	○		●
Pin Movement [7]			○	○		●
In-Mold Decoration (IMD)			○	○		●
Optics			○	○		●
Molding Processes						
Powder Injection Molding (PIM)	○	○	○	○		●
Foam Injection Molding (FIM)		○	○	○		●
Gas-Assisted Injection Molding (GAIM)			○	○		●
Water-Assisted Injection Molding (WAIM)			○	○		●
Co-Injection Molding (CoIM)			○	○		●
Bi-Injection Molding (BiIM)			○	○		●
Chemical Foaming Molding (CFM)			○	○		●
Compression Molding (CM)			○	○		●
Injection Compression Molding (ICM)			○	○		●

1. Material Database: thermoplastics materials, thermoset materials, molding materials, coolant materials, and mold materials.
2. Import geometry from CATIA V5, PTC® Creo®, NX, SOLIDWORKS® and Rhino, as well as STEP, IGES, Parasolid and STL files.
3. Material Hub Cloud (MHC) is a subscription-based service offering the most up-to-date material properties for users to find suitable materials and alternatives.
4. The best on-line practical guide and demo videos by Moldex3D software experts. (Subscription-based service)
5. Moldex3D SYNC supports PTC® Creo®, NX, and SOLIDWORKS®.
6. iSLM is an intelligent and interactive data management platform for plastic product development lifecycle.
7. Prerequisite license is required.
8. Moldex3D FEA Interface supports Abaqus, Ansys, MSC Nastran, NX Nastran, LS-DYNA, MSC Marc, and OptiStruct.
9. Moldex3D Micromechanics Interface supports Digimat and CONVERSE.
10. Machine Response function requires the machine file received from the Machine Characterization Service.

Moldex3D