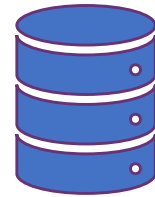


FEAmax Engineering Services

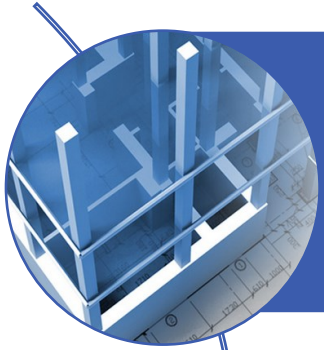
Design, Simulation & Manufacturing

Introduction to FEAmix LLC

- FEAmix LLC was founded in Virginia in 2005, and we moved to North Carolina in 2014.
- FEAmix provides full engineering services from concept to production.
 - **Design:** Product Design, Tooling Design, 2D/3D modeling, etc.
 - **Simulation:** FEA, CFD, Moldflow Analysis.
 - **Manufacturing & Global Sourcing:** 3D printing, Mould Making, CNC, Injection Mold, Die Casting, etc.
- Our office headquarters in Charlotte, North Carolina, USA.
- Our manufacturing center is in Shenzhen, China.

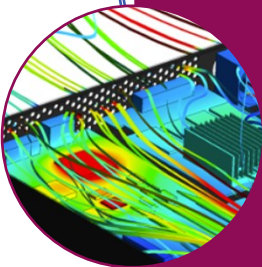


Our Services



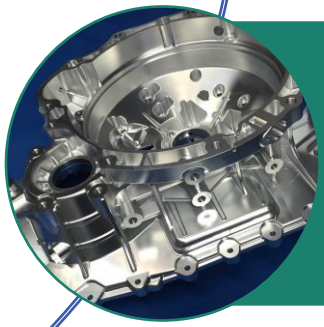
DESIGN

Industrial design; Concept design; Product design; Mechanical Design; Tooling/Mold design; Machinery design; CAD modeling; Reverse engineering; Design Optimization; Design for Manufacture (DFM), etc.



SIMULATION

Finite Element Analysis (FEA); Computational Fluid Dynamic (CFD); Moldflow Analysis; Lab Testing & Verification, Predictive Computer-based Analysis; Materials Characterization, etc.



MANUFACTURE

Prototype Making; 3D Printing; Mold making; Die Casting Mold; Plastic Injection Mold; CNC; Manufacturing Processing; any metal or plastic product sourcing from China; etc.

Our Capabilities

FEA Analysis

- ▶ Linear/Nonlinear Analysis
- ▶ Static Stress Analysis
- ▶ Dynamic Impact/Drop Test
- ▶ Modal Analysis
- ▶ Random Vibration/Seismic
- ▶ Harmonic Analysis
- ▶ Forming Analysis
- ▶ Fracture/Fatigue Analysis
- ▶ Buckling Analysis
- ▶ Thermal Analysis
- ▶ Design/Shape Optimization
- ▶ Multiphysics Analysis
- ▶ Electromagnetic Analysis
- ▶ Composite Analysis

CFD Analysis

- ▶ Steady Flow Analysis
- ▶ Transient Flow Analysis
- ▶ Laminar-Turbulent Transition Modeling
- ▶ Heat Transfer
- ▶ Newtonian / Non-Newtonian Flow Analysis
- ▶ Acoustics / Liquid / Gas
- ▶ Rotating Machinery
- ▶ Erosion Analysis
- ▶ Chemical Reaction & Combustion
- ▶ Mass Transfer Simulation
- ▶ Multiple Streams
- ▶ Free Surface Flow & Cavitation
- ▶ Multiphase Flow/Particle Track
- ▶ Dynamic Cell Addition
- ▶ Motion and Multiphysics

Moldflow Analysis

- ▶ Injection Mold
- ▶ Gas-Assisted Injection Mold
- ▶ Flow/Pack Analysis
- ▶ Warpage Analysis
- ▶ Cooling Analysis/Design

CAD / CAE

- ▶ 3D/2D Part Design
- ▶ CAD Format Conversion
- ▶ Sketch to CAD
- ▶ CAD Modeling & Drafting
- ▶ Machinery Design

Manufacturing

- ▶ Material Analysis
- ▶ Product Testing
- ▶ Product Assembly
- ▶ Tooling Design
- ▶ Mold Fabrication

- ▶ Multi-Component Molding
- ▶ Injection Gate Optimization
- ▶ Hot Runner Optimization
- ▶ Over-Mold / Insert-Mold
- ▶ Multi-shot Injection Mold

- ▶ CAD Model generation
- ▶ Tolerance Analysis
- ▶ Rendering/Animation
- ▶ Tooling/Mold Design
- ▶ Design for Manufacturing

- ▶ 3D Printing
- ▶ Prototype Testing
- ▶ CNC / Die Casting
- ▶ Stamping/E.D.M
- ▶ Product Sourcing from China

Our Customers

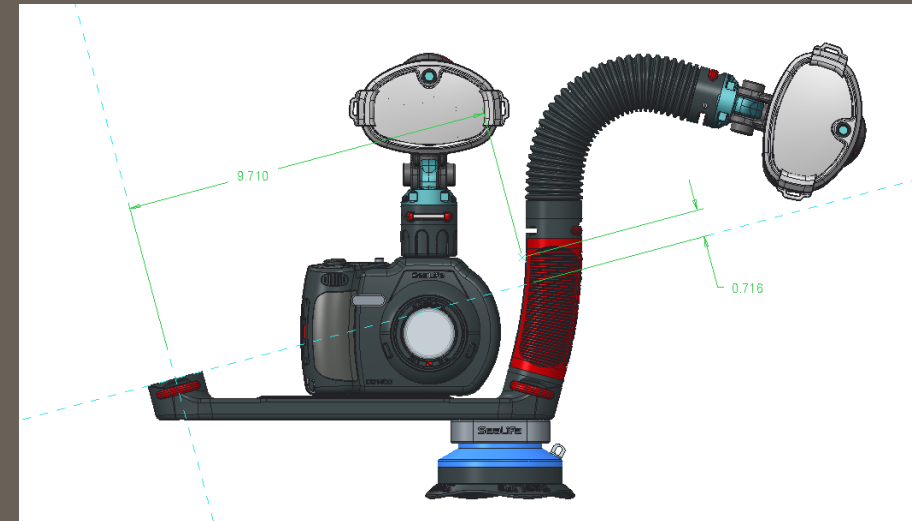
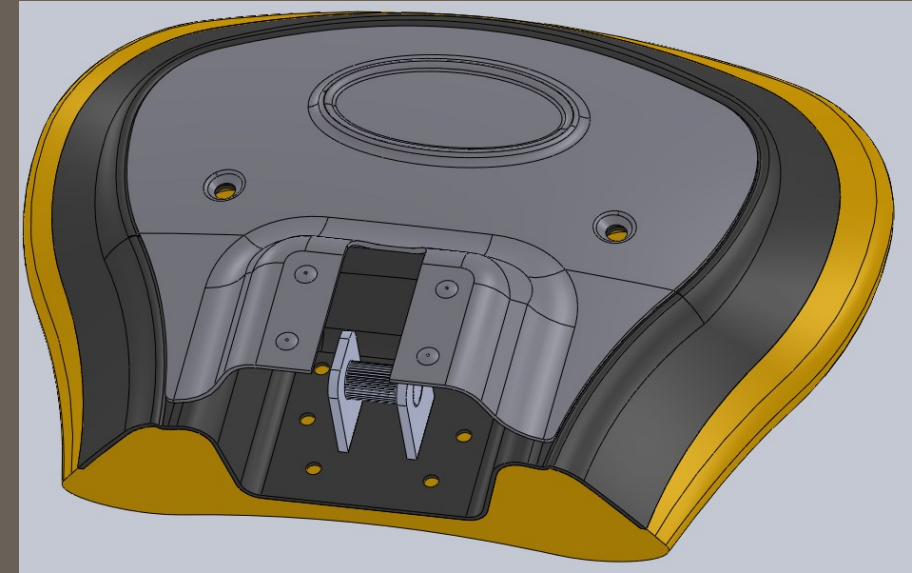
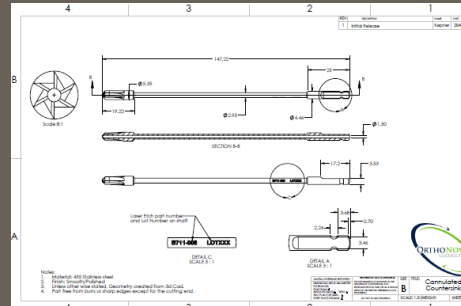
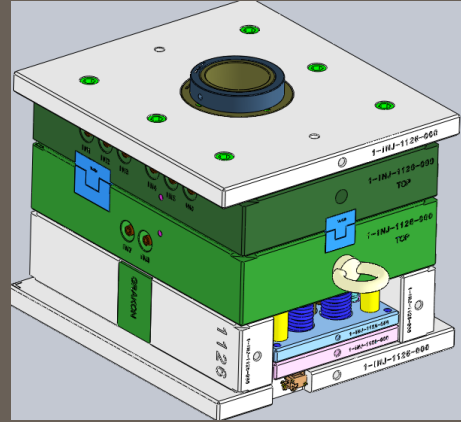
- We have worked for over 400 customers from 22 different countries.
- Our customers are from local start-up to Fortune 500's.
- Our customers are from a very wide range of industries.



Show Cases

Design:

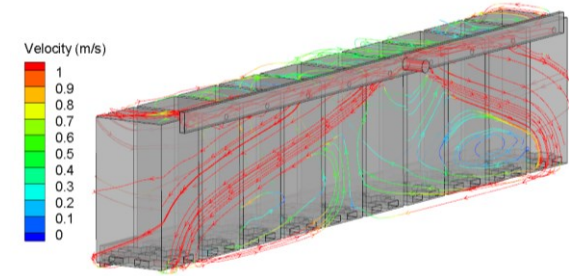
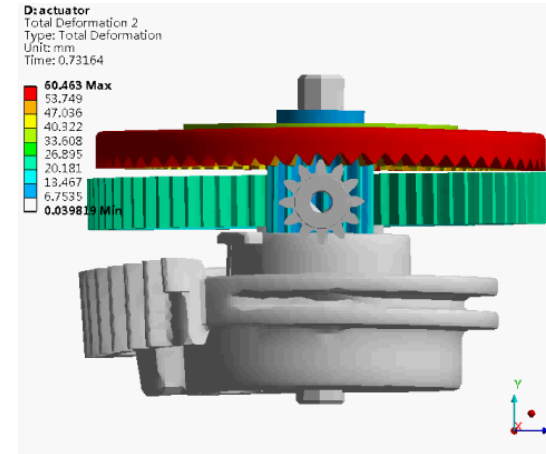
- Create 2D drawings and 3D model.
- Convert the CAD file types.
- Design for Manufacturing (DFM)
- Tooling Design
- Rendering / Animation



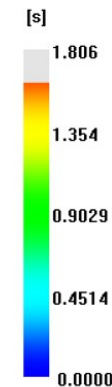
Show Cases

Simulation:

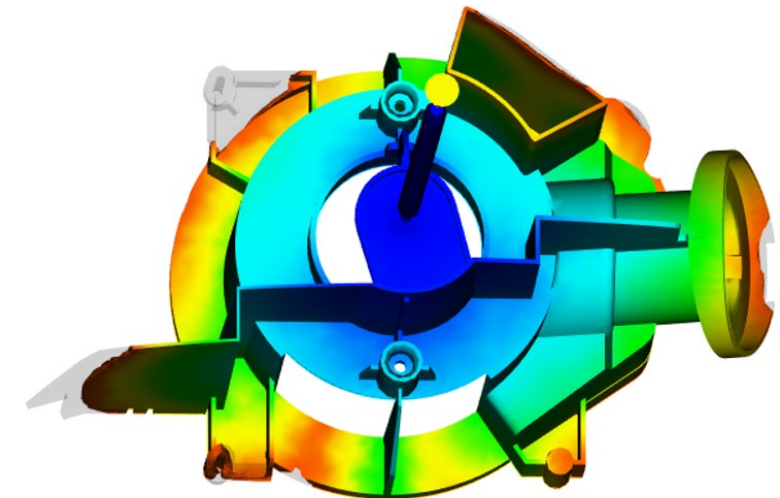
- Finite Element Analysis (FEA).
- Computational Fluid Dynamic (CFD)
- Moldflow Analysis



Fill time
= 1.625[s]



AUTODESK
SIMULATION MOLDFLOW
INSIGHT

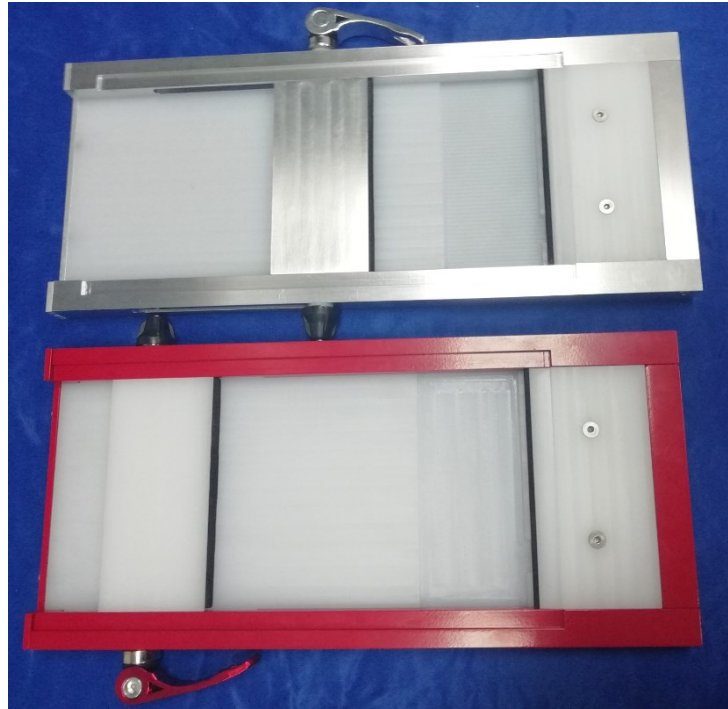


Scale (200 mm)

Show Cases

Manufacturing:

- Metal and Plastic 3D printing.
- Injection Mold.
- Die Casting / CNC
- Stamping
- Lab Testing



Some Projects we worked for Zatkoff

- We started to work with Zatkoff since Dec. 2017.
- Toilet Seal Design & FEA Stress Analysis
 - Predict the sealing force, pressure, deformation, etc.
 - Compare the performance of different designs.
- Rubber Seal belt FEA Stress Analysis.
 - Predict the sealing pressure and reaction force.
 - Determine the sealing performance to meet design criteria.
- Rubber Seal Design FEA Nonlinear Analysis.
 - Predict the sealing pressure and reaction force.
 - Determine the sealing performance to meet design criteria.

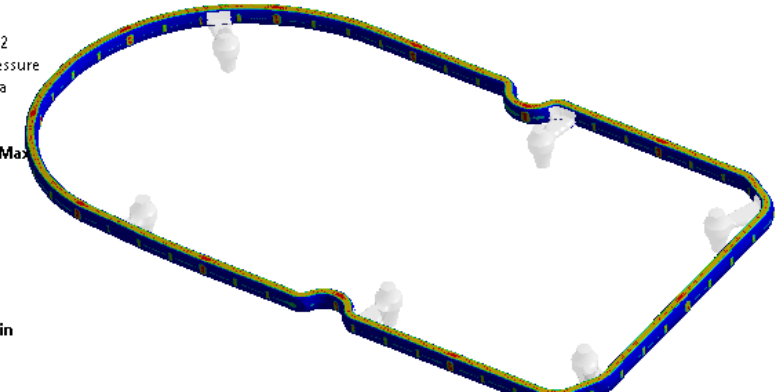
C: ASM-E
Equivalent Elastic Strain
Type: Equivalent Elastic Strain
Unit: in/in
Time: 0.67342

0.10007 Max
0.014784
0.0021841
0.00032266
4.7667e-5
7.042e-6
1.0403e-6
1.5369e-7
2.2705e-8
3.3543e-9 Min



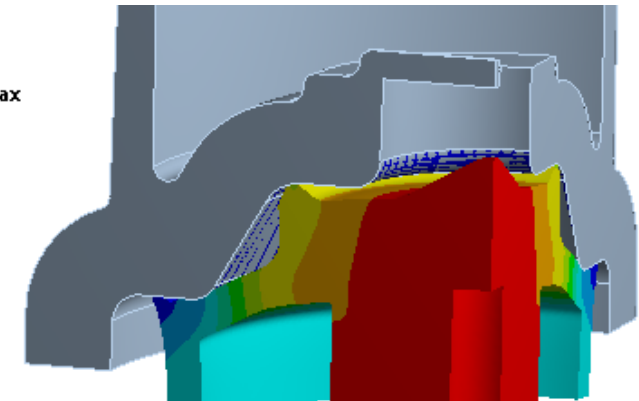
A: T
Pressure 2
Type: Pressure
Unit: MPa
Time: 1

5.4 Max
4
3
2
1.5
1
0.5
0 Min



Unit: in
Time: 1

0.097797 Max
0.08693
0.076064
0.065198
0.054332
0.043465
0.032599
0.021733
0.010866
0 Min



What we need to run FEA Simulation Projects

3D CAD solid model.

- Simplify the model and keep the main concerned features.
- File format could be: *.stp*, *.igs*, *.x_t*, *Solidworks* or *Creo*.

Accurate load condition.

- Which areas would be constrained in what direction.
- Apply how much force, pressure, temperature, displacement, etc. to which area.

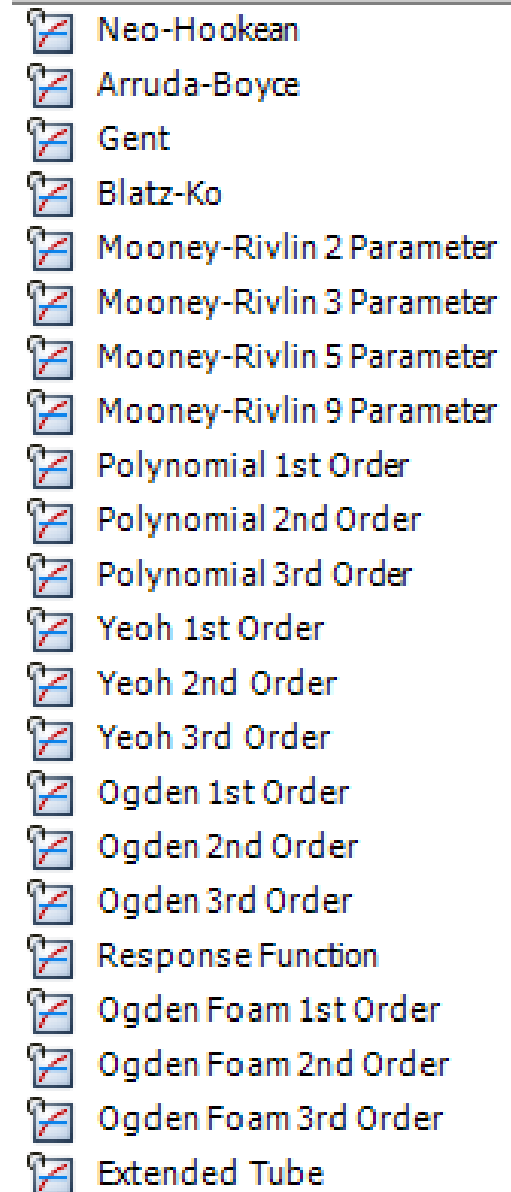
What are your main concerns from the analysis

- Stress, strain, deflection, safety factor, pressure, sealing force, etc. on any specific area.
- Your design criteria or design target.

What we need to run FEA Simulation Projects

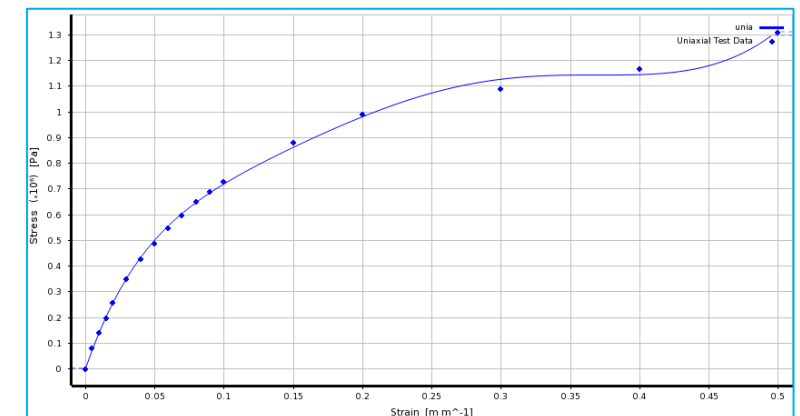
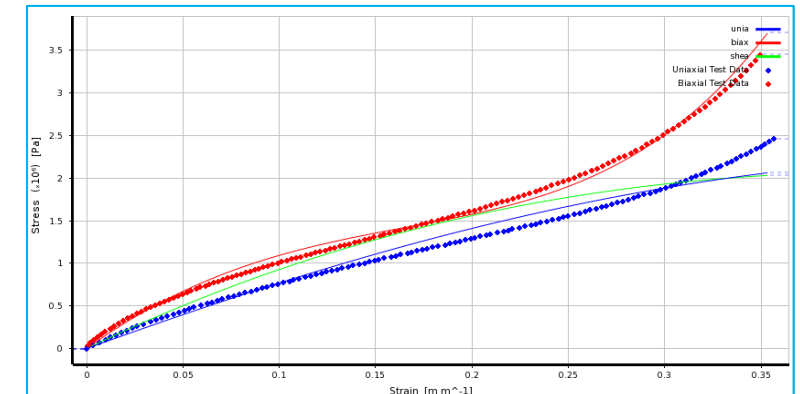
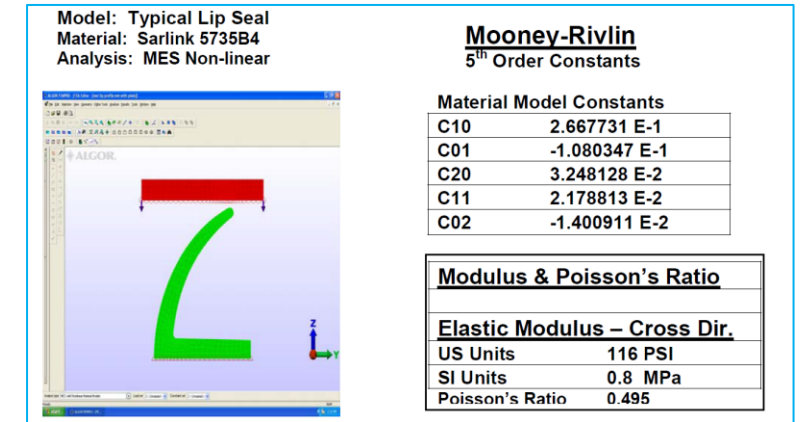
■ Material data.

- Material data is the most important for the FEA analysis.
- The rubber seal is the hyper-elastic material, and the property could not be characterized by linear data (modulus, strength) or one single stress-strain curve.
- There are over 20 hyper-elastic models for rubber material.
- We need to do the uniaxial and biaxial tensile test to obtain two stress-strain curves.
- Choose one of the hyper-elastic model to fit the tested curves, and then use the fitted parameters for the FEA analysis.



What material data we need

- Option#1: the hyper-elastic model and data
 - Provide the hyper-elastic model and the parameter value.
 - Such as the Mooney-Rivlin Model and the C10, C01, C20, etc.
- Option#2: two tested curves
 - Provide the uniaxial and biaxial tensile tested stress-strain curves.
 - We will choose one hyper-elastic model to fit the curves.
- Option#3: the hardness of rubber
 - We will use empirical equations to calculate the parameters of hyper-elastic model and then run the analysis.
- Option#4: one single stress-strain curve
 - We will choose one hyper-elastic model to fit the one curve.



What we provide

- CAD design projects
 - We could create 2D drawing and 3D solid model per design requirement.
 - Provide the file format: .pdf, .stp, .igs and the native Solidworks files.
- FEA/CFD simulation projects
 - The full standard FEA analysis report including all results of deflection, stress, strain, pressure, reaction force, etc.
 - Provide animation files, conclusions, comments and suggestions.
- Q & A
 - Answer any questions regarding the design files and analysis report.
 - Provide suggestions to solve potential issues and improve the current design.

Our Typical Price Schedule

Project Type	Price	Service Content
Standard FEA Analysis	\$800 - \$1,500 per analysis (\$60 - \$80/Hour)	Linear static analysis, Thermal stress analysis, Buckling, Eigenvalue analysis, Linear contact analysis, etc.
Advanced FEA Analysis	\$1,500 - \$3,000 per analysis (\$80 - \$100/Hour)	Nonlinear material/geometry/contact analysis, Dynamic analysis, Fatigue and fracture analysis, Vibration response, Optimization, Coupled physical, etc.
Computational Fluid Dynamic (CFD)	\$2,500 - \$6,000 per analysis (\$130 - \$150/Hour)	Steady/transient flow analysis, Thermal analysis, Chemical reaction, Multi-phase flows, Combustion, etc.
Moldflow Analysis	\$800 - \$1,500 per analysis (\$70 - \$90/Hour)	Standard and advanced analysis
Computer Aided Design/Draft (CAD)	\$70/Hour	2D drawing, 3D modeling, Geometry design, File format conversion, Animation, Mould design, etc.
Prototype & Manufacturing Services from China	\$30 - \$50/Hour	It is highly related with the project type and requirement, while the labor price would be lower than \$50/hour.

Collaboration with Clients on Future Projects

CAD Design and Drafting

- Create 2D drawing and 3D solid model per design requirement.
- Make any changes to the existing model. Rendering and Animation.

FEA, CFD & Moldflow Analysis

- Perform FEA structure stress analysis to optimize the design. Find out and solve potential design issues.
- We provide the mold design and moldflow analysis if you may make the plastic product.

Manufacturing Services

- We have 2 injection mold partners in US and 10 manufacturing partners in China.
- We could make any 3D printing prototypes. We have a small office in China and could find the right manufacturer to make your products.

Contact Us

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Questions