

# DEFORM Premier

DEFORM Premier is the comprehensive process simulation system designed to analyze complex metal forming processes, microstructure and grain evolution, heat transfer, residual stress and distortion. Manufacturing operations can be simulated on the computer, avoiding much of the cost and delay of shop trials. Typical applications include hot forging (open die and closed die), warm and cold forming, cogging, rolling, drawing, extrusion, heating, heat treatment, machining and mechanical joining.

For over three decades, DEFORM has proven to be an accurate and robust finite element analysis (FEA) solution for industrial applications. The simulation engine is capable of predicting large deformation metal flow, heat transfer and material characteristics with great accuracy. A sophisticated mesh generator automatically creates adaptive, optimized meshes. Arbitrary, body-to-body contact supports the analysis of multiple deforming bodies. User-defined tools are available throughout the system, allowing advanced users to customize the model to their requirements.



*The core and rim of the bimetallic coin, shown above, were coined and mechanically joined together within a single operation. The multiple deforming body, advanced meshing and arbitrary contact capabilities of DEFORM-3D were required for such a complex simulation. Each body was modeled with over one million elements.*

DEFORM Premier provides industry-leading analysis capabilities and a powerful, yet easy-to-learn graphical user interface. Its 'state of the art' multiple operation interface offers guided data input for a wide range of processes types. 2D or 3D operations and similar or dissimilar processes can be combined into a single project. Entire process sequences may be solved automatically, without user intervention. This is the foundation for a modeling system that incorporates forming, heat treatment, material modeling, design of experiments (DOE) and optimization.

Scientific Forming Technologies Corporation (SFTC) staff has extensive manufacturing, academic and software-industry experience. This diverse background enables SFTC to provide unparalleled training and technical support to DEFORM users.

## Product Specifications

- All DEFORM systems and modules are included.
- Deformation, heat transfer and microstructure are calculated in an integrated simulation environment.
- The DEFORM-2D and DEFORM-3D systems model a wide range of geometries, processes and behaviors.
- Material models include elastic, rigid-plastic/viscoplastic, elastic-plastic, porous and hyperelastic.
- Multiple operation sequences run without user intervention.
- Simulation results are analyzed via a powerful post-processor.
- Application-specific templates simplify the setup workload for advanced forming applications.
- Furnace, induction and resistance heating methods are supported.
- A machining distortion 'template' streamlines the calculation of distortion after material removal.
- Automated DOE/Optimization capabilities allow for large studies on design and process variables.
- Advanced material characterization tools are available within the included Material Suite module.



Design Environment for FORMing

## Computer System Requirements

- The minimum recommended configuration is:
  - 16 GB RAM,
  - 1 TB free disk space,
  - DVD writer,
  - Windows 7/8/10 (64-bit) or select Linux configurations.

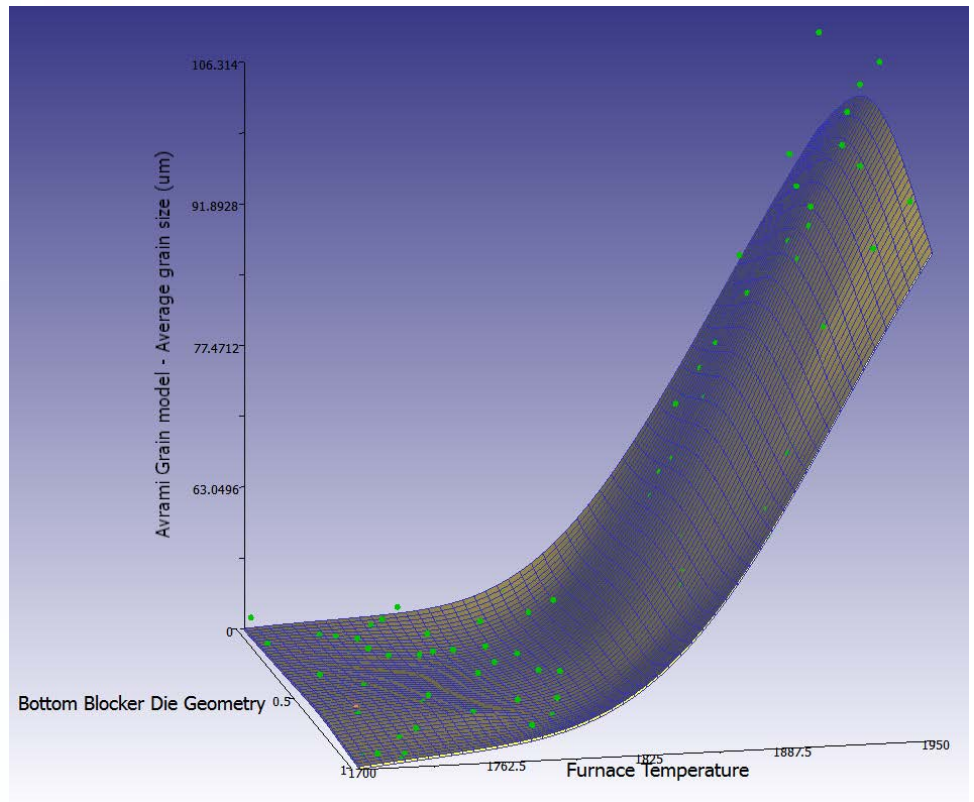
## Licensing

- The FEM engine is licensed to run on two CPU threads in a floating license configuration. Parallel processing options with additional threads are available.
- This floating license is available to use within a local-area network.
- A simulation queue is included to efficiently run multiple simulations without user intervention.

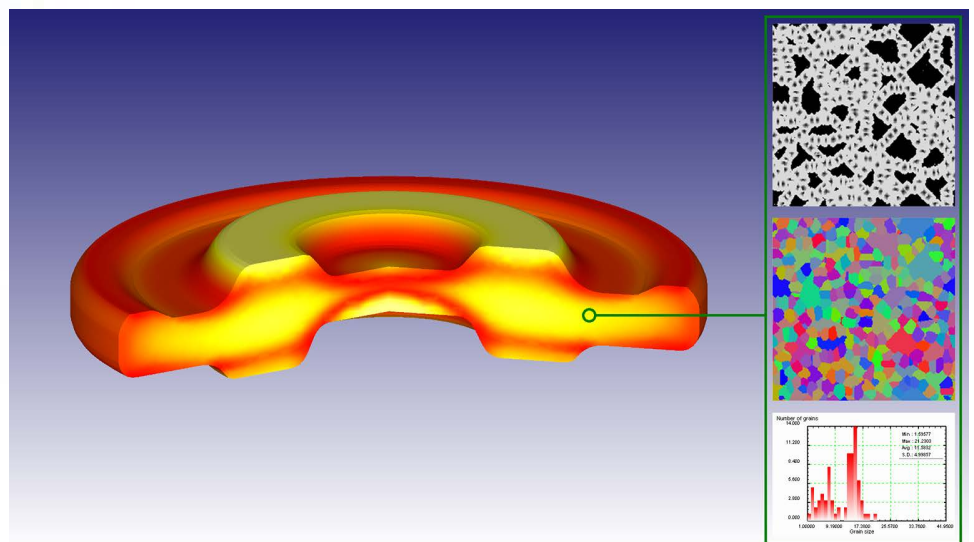
## General Information

- Training, support, updates and DEFORM User Group meetings are available to active users.
- Online documentation is provided in HTML and PDF formats.
- The DEFORM Material Database includes a wide range of steel, aluminum, titanium, superalloy, copper and other material data.
- Technical support is readily available by phone, email, web meetings and the online DEFORM User Area.

# DEFORM Premier



DEFORM Premier provides very powerful DOE and optimization capabilities to run multiple simulations with controlled process variation. DOE allows the user to define a test matrix using a full factorial or statistical sampling (Latin Hypercube) in advance. Optimization allows the system to find a best process within defined constraints. A custom post-processor automates much of the data mining, displaying results in a usable format.



Microstructure modeling is used to predict residual stress and a wide range of mechanical properties. SFTC is the leader in the development and application of microstructure modeling for research and industrial applications, as shown with the Cellular Automata (CA) model using the RVE method.

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