HEXAGON | simufact

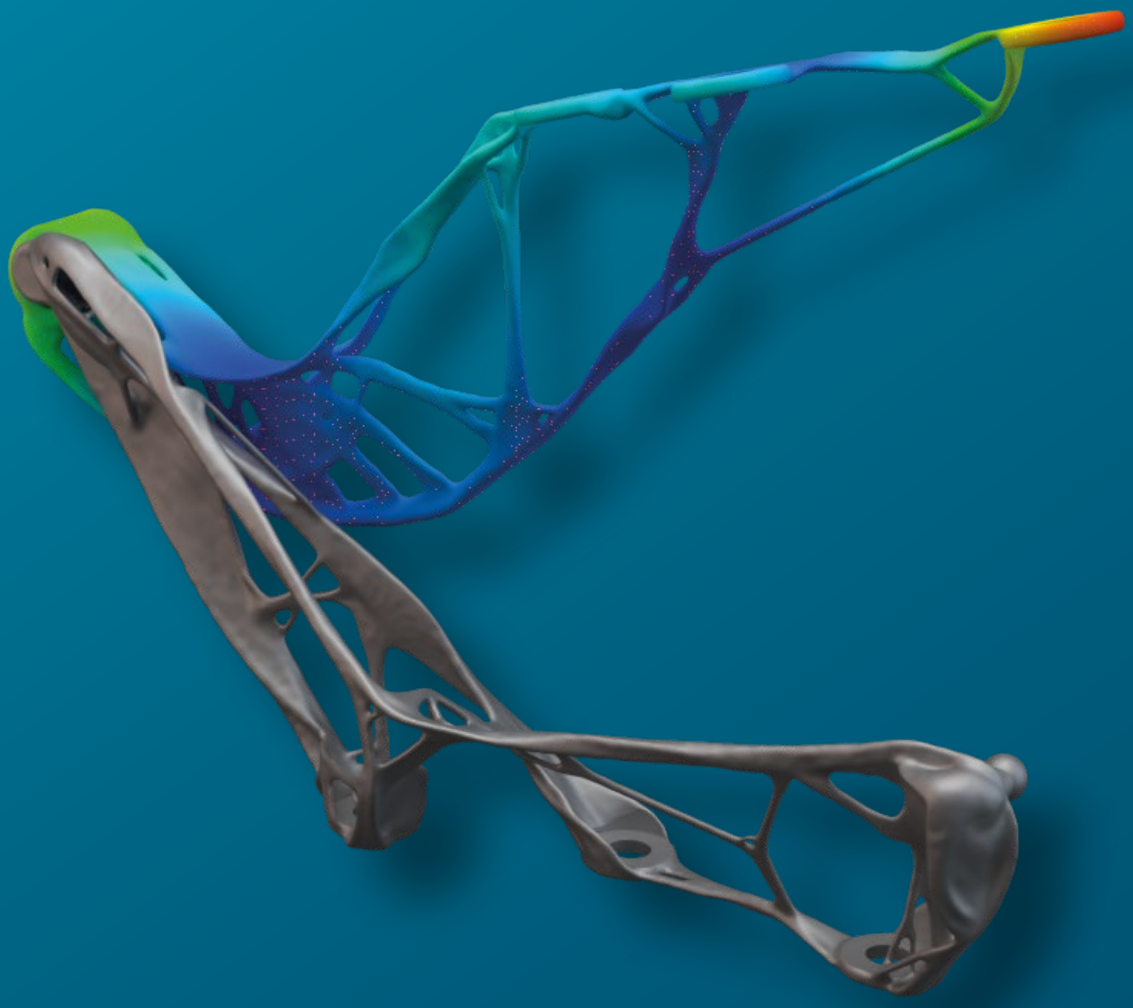
Brochure

Simufact Additive

Software Solution for Metal Additive Manufacturing Processes and Cost Optimisation

Simufact Additive is the software solution to print AM parts first time right

Distortion of AM parts during the printing and manufacturing process is a major impediment to companies that want to realize the full benefits of the additive manufacturing process. An enormous amount of unproductive time and costs are spent on physical trials and errors. Simufact Additive is a solution aimed at predicting and resolving distortion and failures during the entire print, heat treatment, cutting and HIP process virtually – before printing the real part.



Simufact Additive

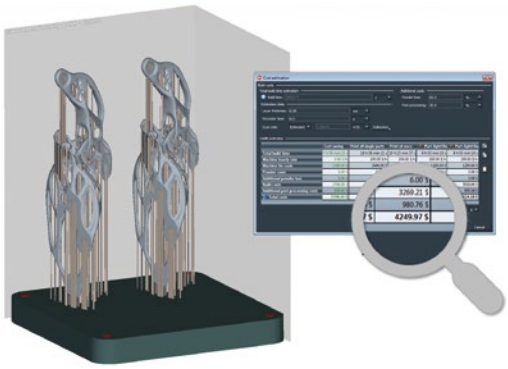
Typical challenges in Metal Additive Manufacturing

Challenges from a business point of view:

- high hourly machine costs (machine acquisition and power costs)
- machine availability: Experimental testing on the machines reduces the productiveness
- relatively high material costs

Challenges from a technical point of view:

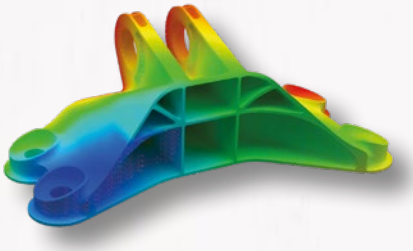
- different production methods and their special physics
- different 3D printers and their machine-specific influence on the manufacturing process
- differing metal powder quality

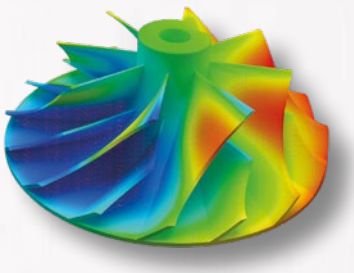


Huge amount of machine input parameters (up to 200) is involved in an AM printing process, all having an impact on the achieved behavior of the final parts. Prior to producing the parts, you have to answer questions like

- What is the best part orientation with regard to costs (machine cost and material usage) and feasibility?
- How many components can be printed simultaneously?
- What is the best support structure strategy in terms of location and properties?
- How much does one single part or the whole build job cost?

Complex physical interactions cause an inconsistent quality of the produced parts.
Non-optimal part design for additive manufacturing leads to incorrectly produced or even failed parts (cracks), due to distortion and residual stress.





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Use Simufact Additive to solve your challenges

Simufact Additive is a powerful and scalable software solution for the simulation of metal-based additive manufacturing processes.

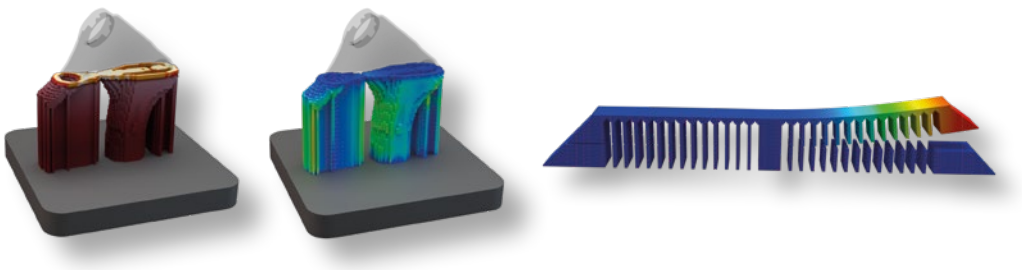
Simufact Additive helps you to produce AM parts first-time-right:

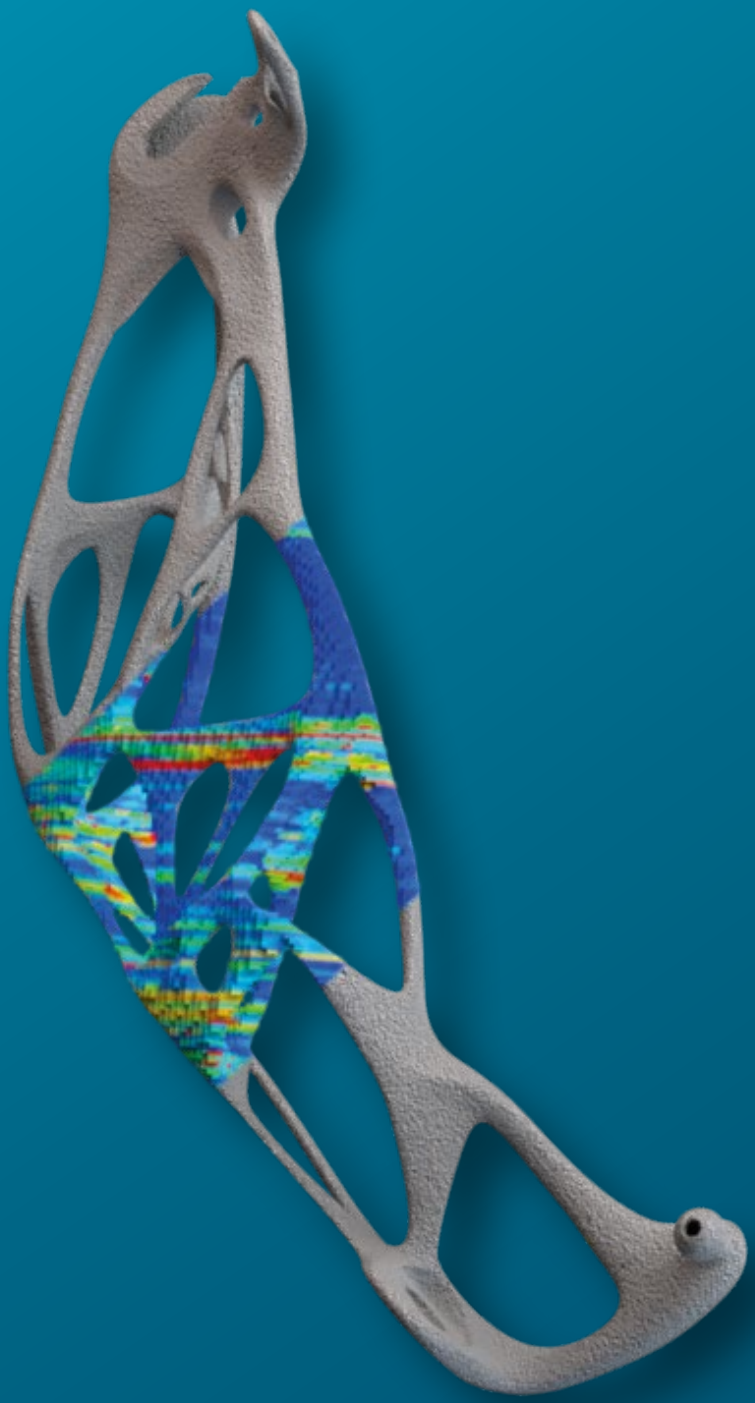
- condition of the part after printing, heat treatment, base plate and support structure removal
- deformation of the manufactured part and of the base plate
- optimise the build-up orientation and the support structures
- indicate criteria-based part failures
- minimise residual stress
- cost estimation

Reach your aim more quickly with process specific functions

Simufact Additive has a modular architecture.

The modular concept helps you to choose exactly the relevant functions for your manufacturing processes. This approach saves you costs and gives you the flexibility to adapt to changing requirements. Additional modules offer you further valuable functions for the daily use of the software.





Simufact Additive enables you to simulate the following applications:

Powder-Bed-Fusion-Processes

Simufact Additive is focussed on Powder Bed Fusion processes including Selective Laser Melting (SLM), Direct Metal Laser Sintering (DMLS), LaserCUSING®.
Direct Energy Deposition (DED) processes are currently covered by Simufact Welding.

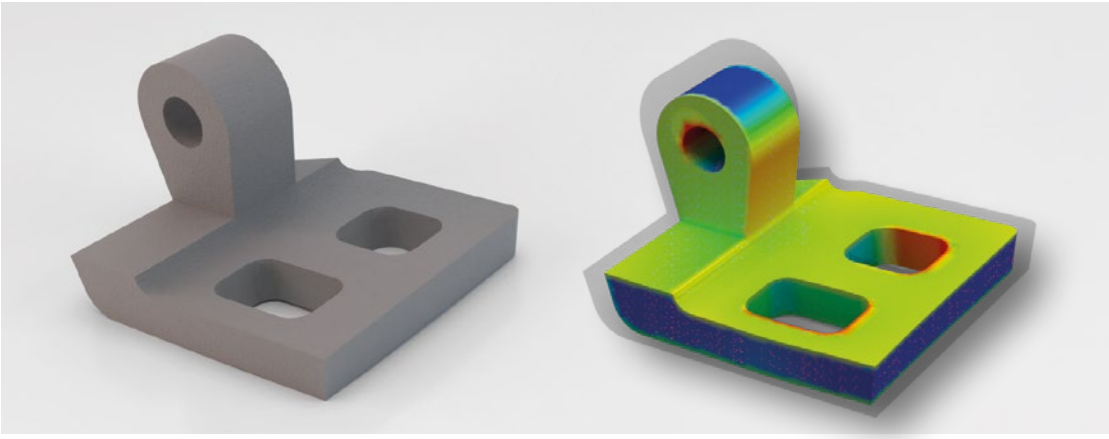
Using the macroscopic approach, you get simulation results within a few minutes, which predict the tendency of stresses and distortions. Using the thermomechanical approach, you get the temperature field in addition, which is more accurate but takes longer than the macroscopic approach.

Metal Binder Jetting

One of the key challenges for metal binder jetting manufacturers has been to predict changes during the sintering process. As a result, many manufacturers have been unable to realise the potential of metal binder jetting to reduce the time and cost of manufacturing and enable large-volume additive manufacturing with metals.

Simufact Additive supports manufacturers to simulate the shrinkage considering i. a. the thermal strain, friction and the gravity during sintering. Compensating these changes, manufactures print 3D parts “first-time-right” and significantly reduce the high proportion of parts which have to be scrapped, re-processed and expensively re-designed.

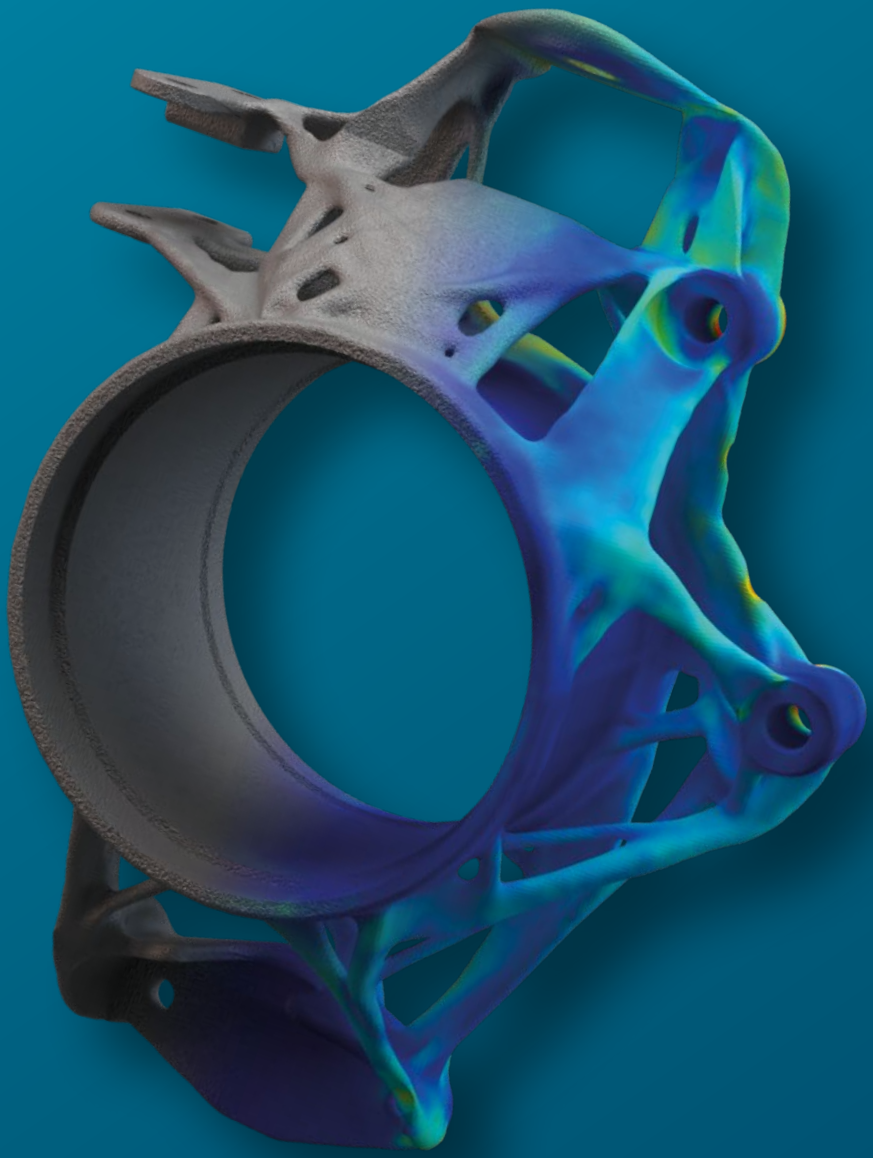
Using Simufact Additive they can also predict sintering-induced stress in advance, and indicate where defects might occur. Manufacturers can use this information to manually make adjustments and reduce the need for multiple product iterations.



Initial CAD component and the final state after the sintering process

Benefit from the process simulation with Simufact Additive:

- **Shorten your learning process dramatically.**
- **Run more variations prior to the production.**
- **Shorten time-to-market.**
- **Increase machine / manpower availability and productivity.**
- **Reduce material and energy consumption costs of physical experiments.**



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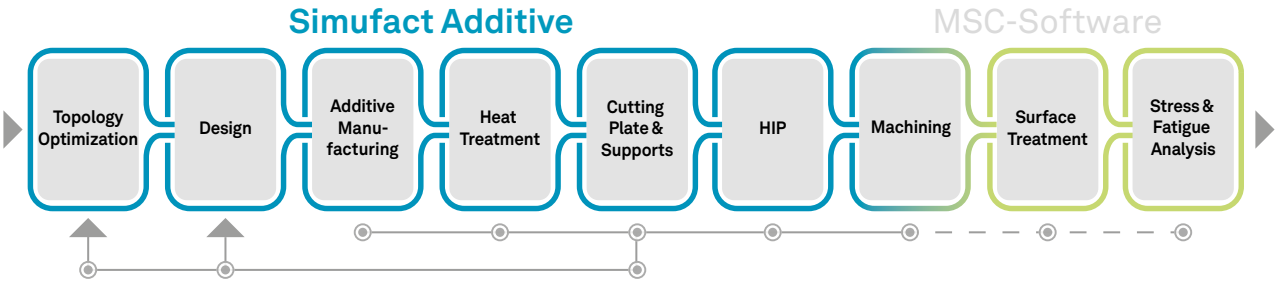
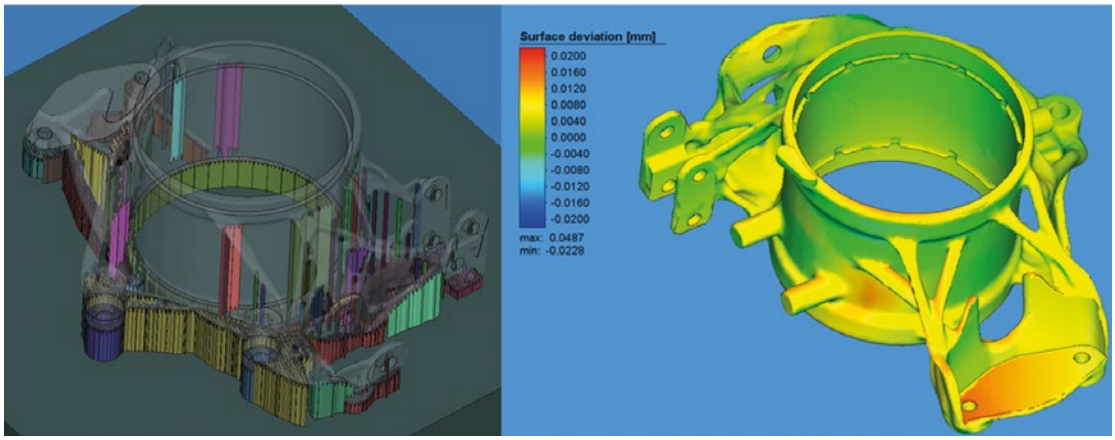
Simufact Additive covers the core manufacturing process chain including:

- **Additive Manufacturing**
- **Heat Treatment**
- **cutting & removal (of the support structures and base plate)**
- **Hot Isostatic Pressing (HIP) process**



The simulation of the manufacturing process with Simufact Additive is performed in advance by our fully automated software solution MSC Apex Generative Design. The user is thus provided with the design for the additive production and he saves material and costs.



+ 5 reasons
why Simufact Additive is pioneering!

1. Problem solver
Simufact Additive helps you solve the main issues in 3D metal printing:
a. significantly reduce distortions
b. minimises residual stress to avoid failures
c. optimises build-up orientation and costs

2. Strong concept
Simufact Additive´s multi-scaling approach combines the best approaches in one unique software solution – from an extremely fast mechanical method to a fully thermo-mechanically coupled transient analysis with highest accuracy in simulation results.

3. Special purpose software
Simufact Additive is a specialised software solution dedicated to AM process simulation.

4. Best-in-class GUI
Simufact Additive comes with an intuitive and user-friendly graphical user interface (GUI) ensuring an extraordinary user experience. The flexible GUI concept allows machine and application-specific dialogs aligned with the real process workflow.

5. Sophisticated Technology
Simufact Additive is based on MSC´s proven MARC solver technology:
- leading solution for non-linear numerical simulations
- covering a broad range of physics
- further dedicated advancement for AM purposes

Simufact Additive comes with a best-in-class GUI ensuring an extraordinary user experience:

- user-friendly, intuitive use
- fewer icons for a better usability
- context sensitive, use right mouse click
- prepared for application- and machine-specific dialogs
- support of complex models
- GUI is oriented to real AM workflow

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Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Simufact, part of Hexagon's Manufacturing Intelligence division, applies simulation and process knowledge to help manufacturers optimise metal forming, mechanical and thermal joining and additive process quality and cost. Learn more at simufact.com. Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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